

THE FLATFISHES (HETEROSOMATA) OF INDIA, WITH A LIST OF THE SPECIMENS IN THE INDIAN MUSEUM.

PART II.*

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(Plates IV—VII.)

INTRODUCTION.

In this, the second and concluding part of my report on the Indian Heterosomata I have dealt with the families Soleidae and Cynoglossidae, which together constitute the division Solaeiformes of Regan's classification of the order.¹ The sub-division into genera of the Flatfishes related to *Solea* and *Synaptura* is a matter of some difficulty, and, pending the examination of further material and a complete revision of the whole family, the arrangement adopted in this paper must be regarded as tentative.

The illustrations accompanying both parts of this report are the work of Major W. P. C. Tenison, D.S.O.

Family 4. Soleidae.

Eight genera represented in Indian Waters.

Synopsis of the Indian Genera.

- I. Pelvic fins symmetrical or subsymmetrical, that of the right side free from the anal or joined by a low membrane to the base of the first anal ray; snout not prolonged into a hook, the dorsal rays not extending to its tip; interbranchial septum entire.
 - A. Both pectoral fins developed.
 - 1. Gill-opening on ocular side ending opposite lower edge or lower part of pectoral base; pectoral fin on both sides generally well developed, rounded or obtusely pointed, not connected with opercular membrane.
 - a. Posterior rays of dorsal and anal fins short, not connected with caudal fin; urinogenital papilla situated on the right side of the body at some distance from the anus 1. *Solea*.
 - b. Posterior rays of dorsal and anal fins more or less elongate and united with the rays of the caudal fin; urinogenital papilla situated between the pelvic fins and close to the anus .. 2. *Brachirus*.

* The first part appeared in the *Records of the Indian Museum*, XXIX, part 1, p. 7 (April, 1927).

¹ *Ann. Mag. Nat. Hist.* (8) VI, p. 484 (1910).

2. Gill-opening on ocular side ending opposite upper part of pectoral base ; pectoral fins small, especially on blind side ; opercular membrane joined to upper portion of the pectoral fin ; posterior rays of dorsal and anal fins rather long.
 - a. Posterior rays of dorsal and anal fins connected only with the base of the caudal fin ; anterior nasal tube of ocular side elongate ; only the hinder parts of dorsal and anal fins scaly on blind side ; anal with 78 to 82 rays 3. *Soleichthys*.
 - b. Posterior rays of dorsal and anal fins connected with at least the basal third of the caudal fin ; anterior nasal tube of ocular side short or of moderate length ; dorsal and anal fins entirely scaly on blind side ; anal with 56 to 71 rays.
 - Scales ctenoid ; first dorsal ray not enlarged 4. *Zebrias*.
 - Scales cycloid ; first dorsal ray enlarged, free 5. *Aesopia*.
- B. Pectoral fins absent ; lateral line with a more or less distinct accessory dorsal branch on blind side.
 1. Each ray of dorsal and anal fin with an open pore near its base 6. *Pardachirus*.
 2. Rays of dorsal and anal fins without pores 7. *Aseraggodes*.
- II. Pelvic fins markedly asymmetrical, that of the right side median, elongate and joined to the anal ; snout prolonged into a hook, the dorsal rays extending to its extremity ; interbranchial septum perforated ; anterior nostril of blind side dilated and fringed 8. *Heteromyceteris*.

1. *Solea* Quensel.

Solea, Quensel, *Vet. Acad. Handl.*, XXVII, pp. 53, 229 (1806).

Solea (part), Günther, *Cat. Fish.*, IV, p. 462 (1862) ; Day, *Fish. India*, p. 425 (1877).

Several species from the Eastern Atlantic, Mediterranean and Indo-Pacific ; three known from India.

Synopsis of the Indian Species.

- I. Depth $2\frac{1}{2}$ to 3 in length ; head 4 to $4\frac{3}{4}$; dorsal with 67 to 77 rays ; anal with 52 to 63 rays.
 - A. Depth $2\frac{3}{8}$ to 3 in length ; maxillary reaching middle of eye ; distance from angle of mouth to tip of lower jaw 3 to $3\frac{1}{2}$ in head ; dorsal with 72 to 77 rays ; anal with 59 to 63 rays ; barbel-like processes on blind side of head well developed (fig. 1a) 1. *elongata*.
 - B. Depth $2\frac{1}{2}$ to $2\frac{3}{8}$ in length ; maxillary hardly reaching middle of eye ; distance from angle of mouth to tip of lower jaw $3\frac{1}{2}$ to $3\frac{3}{8}$ in head ; dorsal with 68 to 71 rays ; anal with 54 to 58 rays ; barbel-like processes on blind side of head moderately developed (fig. 1b) 2. *heinii*.
- II. Depth 2 to $2\frac{1}{2}$ in length ; head $3\frac{1}{2}$ to $4\frac{1}{8}$; dorsal with 58 to 67 rays ; anal with 41 to 51 rays 3. *ovata*.

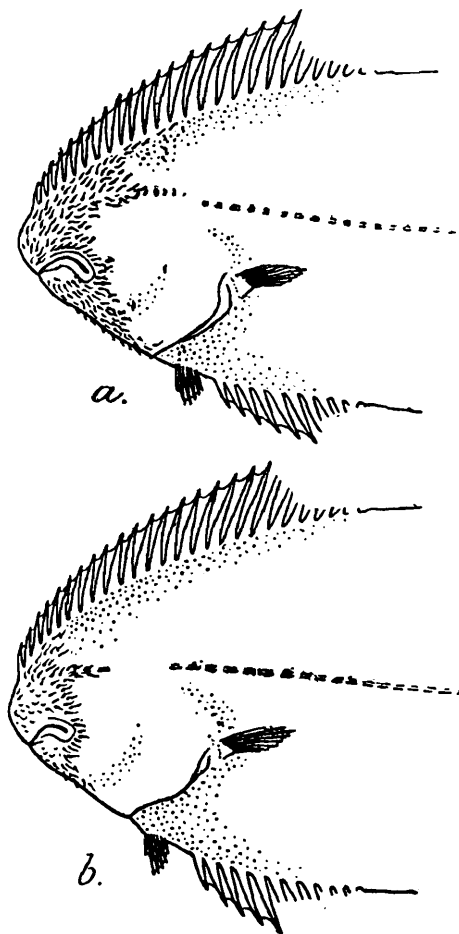
Solea indica was described by Günther [*Cat. Fish.*, IV, p. 474 (1862)] from a single example, 46 mm. in total length said to have been collected

at Madras by Mr. T. C. Jerdon. Examination of the type shows this to be an example of *Achirus lineatus*, Linn., an American species, and there is little doubt that the type locality is incorrect.

1. *Solea elongata* Day.

Solea elongata, Day, *Fish. India*, p. 426, pl. xc, fig. 4 (1877).

Depth of body $2\frac{3}{5}$ to 3 in the length, length of head 4 to $4\frac{3}{4}$. Snout rather obtusely pointed, length (measured from anterior margin of lower eye) $3\frac{1}{3}$ to 4 in head. Eyes separated by a narrow scaly interspace, the upper in advance of the lower; diameter $3\frac{1}{2}$ to 4 in length of head. Maxillary extending to below middle of eye; distance from angle of mouth



TEXT-FIG. 1.—Blind side of head of (a) *Solea elongata* Day; (b) *Solea heinii* Steind. Nat. size.

to tip of lower jaw 3 to $3\frac{1}{2}$ in length of head. No dilated nostril on blind side. Dorsal (70) 72-77. Anal 59-63. Right pectoral 2 to $2\frac{1}{2}$, left $2\frac{2}{5}$ to 3 in length of head. About 110 scales in a longitudinal series¹; those on anterior part of blind side of head produced into barbel-like processes (text-fig. 1a). Brownish or greyish, spotted or blotched with darker; the markings are more distinct near the edges of the body, and often tend to form irregular vertical bands; a black blotch on distal part of pectoral.

Described from several specimens, 60 to 115 mm. in total length.

¹ Counted above the lateral line from the level of the upper angle of the gill-opening to the base of the caudal.

Hab.—From the Persian Gulf to Madras ; Ceylon.

106-120	North End of Persian Gulf, 15 fms. "Investigator."	
157-8	Stn. 352 ; Persian Gulf, 13 fms.	"
14324-5	Trincomali, Ceylon.	"

A specimen in the British Museum from Karachi.

2. *Solea heinii* Steind.

Solea heinii,¹ Steindachner, *Denkschr. K. Ak. Wiss. Wien*, LXXI, p. 153, pl. i, fig. 3 (1902).

Solea sindensis, Jenkins, *Rec. Ind. Mus.*, V, p. 133 (1910) ; *Mem. Ind. Mus.*, VII, pl. iii, fig. 2 (1910).

Close to the preceding species. Body (generally) somewhat broader, the depth $2\frac{1}{2}$ to $2\frac{2}{3}$ in the length. Snout somewhat broader, the anterior margin more rounded, length (measured from anterior edge of lower eye) $3\frac{1}{4}$ to $3\frac{4}{5}$ in head. Maxillary hardly extending to below middle of lower eye ; distance from angle of mouth to tip of lower jaw $3\frac{1}{2}$ to $3\frac{2}{3}$ in length of head. Dorsal (67) 68-71. Anal (52) 54-58. Barbel-like processes on blind side of head less developed. Brownish or greyish, more or less densely spotted and blotched with darker ; some dark streaks and spots on the vertical fins ; a black blotch on distal part of pectoral.

Described from several specimens, 60 to 102 mm. in total length, including the type of *Solea sindensis*.

Hab.—Southern Arabia and Mekran Coast.

14303-4	.. Mekran Coast, Arabian Sea.	Townsend.
1846	(Type of <i>Solea sindensis</i>). Karachi.	
—	??	

Several specimens in the British Museum from Karachi.

3. *Solea ovata* Richardson.

Solea ovata, Richardson, *Rep. Brit. Assoc. Adv. Sci.*, 1845 (1846), p. 279 ; Günther, *Cat. Fish.*, IV, p. 472 (1862) ; Day, *Fish. India*, p. 426, pl. xciii, fig. 1 (1877) ; Alcock, *J. Asiat. Soc. Bengal*, LVIII, pt. 2, p. 285 (1889).

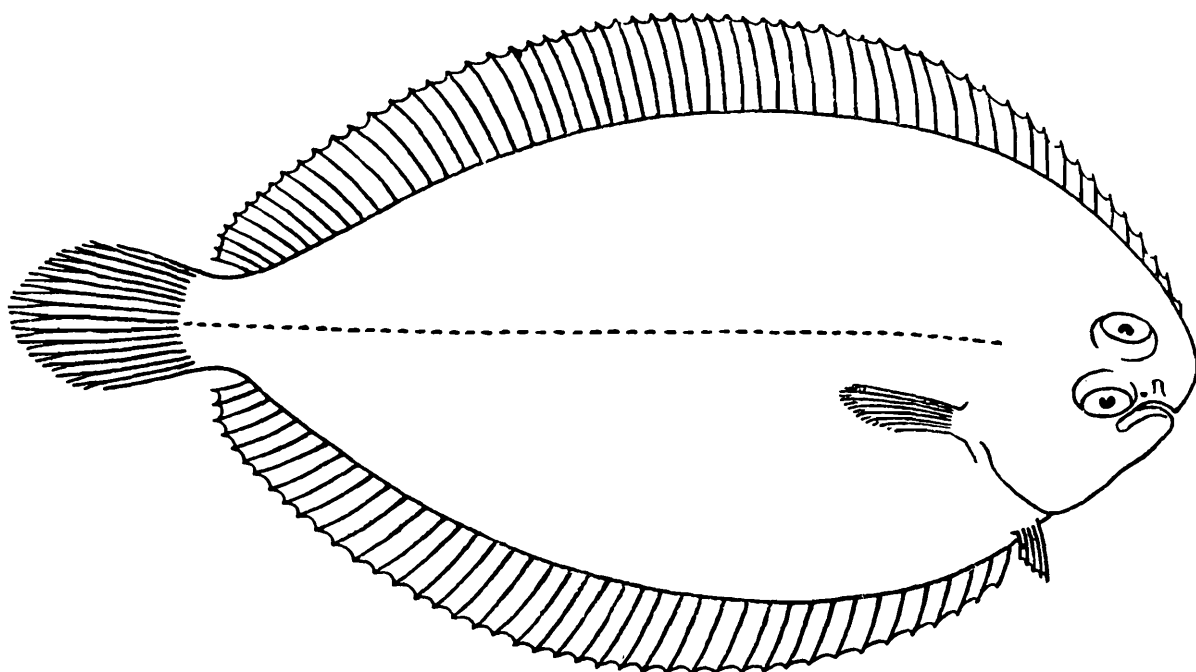
Solea humilis, Cantor, *J. Asiat. Soc. Bengal*, XVIII, pt. 2, p. 1201 (1850) ; Günther, *Cat. Fish.*, IV, p. 471 (1862) ; Bleeker, *Atl. Ichth.*, VI, p. 16, Pleuron, pl. vi, fig. 1 (1866).

Solea maculata (Cuvier) Bleeker, *Verh. Bat. Gen.*, XXIV, Pleuron, p. 17 (1852).

Depth of body 2 to $2\frac{1}{5}$ in the length, length of head $3\frac{1}{2}$ to $4\frac{1}{6}$. Eyes separated by a scaly interspace of moderate width, the upper in advance of the lower ; diameter 4 to $4\frac{3}{5}$ in length of head. Maxillary extending to below middle of eye or not quite as far. No dilated nostril on blind side. Dorsal 58-67. Anal 41-51. Right pectoral $1\frac{2}{3}$ to $2\frac{2}{5}$, left $2\frac{1}{2}$ to 3 in length of head. 100 to 108 scales in a longitudinal series ; those on anterior part of blind side of head produced into barbel-like processes. Brownish or greyish, spotted and blotched with darker ; sometimes a series of white blotches along upper and lower edges of body, and one or two whitish spots in the region of the lateral line ; a black blotch on distal part of pectoral.

¹ This name was provisionally suggested by Steindachner for certain specimens from Gischin, S. Arabia, as he was doubtful whether they were really examples of *Solea elongata*, Day.

Described from several specimens, 60 to 105 mm. in total length, including the type of *Solea humilis*.



TEXT-FIG. 2.—Outline drawing of *Solea ovata* Richardson. $\times 1\frac{3}{4}$.

Hab.—Coasts of India, through the Malay Peninsula and Archipelago to China.

153-5	..	..	Vasco Bay, Portuguese India, 2 to 3½ fms.	Kemp.
—		..	Sandy Bay, N. W. of Nazareth Point, Mormugao Bay, Portuguese India.	..
183-4	.	.	Ditto	..
1091, 1094	..	..	Madras. ..	
12178-80	..	..	Orissa Coast, 7 to 10 fms.	.. "Investigator."
12243-4, 12258		..	..	..

Specimens in the British Museum from Madras.

The specimens examined exhibited considerable variation in the length of the pectoral fins, but I am unable to recognize more than one species.

2. *Brachirus* Swainson.

Brachirus, Swainson, *Nat. Hist. Fish.*, II, pp. 187, 303 (1839).

Synaptura, Cantor, *J. Asiat. Soc. Bengal*, XVIII, pt. 2, p. 1204 (1850).

Euryglossa, Kaup, *Arch. Naturg.*, 1858, p. 99.

Several species from the Eastern Atlantic and Indo-Pacific; five known from India.

Synopsis of the Indian Species.

- I. Form elongate; depth $3\frac{1}{2}$ to $4\frac{1}{2}$ in length; a bony prominence on the snout; 155 to 160 scales in a longitudinal series (*Synaptura*.)
 - A. Depth $3\frac{1}{2}$ to $4\frac{1}{2}$ in length; no barbel between the nostrils; right pectoral 5 to 6 in head; body without white spots 1. *commersoni*.
 - B. Depth $3\frac{1}{2}$ to $3\frac{1}{2}$ in length; a barbel between the nostrils; right pectoral $2\frac{1}{2}$ to $3\frac{1}{2}$ in head; body with 2 to 5 series of small white spots 2. *albomaculata*.
- II. Form ovate; depth of body 2 to $2\frac{3}{4}$ in length; no bony prominence on the snout; 63 to 74 scales in a longitudinal series (*Brachirus*.)

A. Eyes separated by a scaly interspace, diameter 5 to 8 in head; depth 2 to $2\frac{1}{4}$ in length; right pectoral with more than 4 rays, length much greater than diameter of eye.

1. Dorsal with 62 to 72 rays; anal with 47 to 57 rays; none of the scales enlarged .. 3. *orientalis*.

2. Dorsal with 57 to 61 rays; anal with 43 to 46 rays; scales of nape and upper part of head enlarged 4. *pan*.

B. Eyes contiguous, diameter about 11 in head; depth $2\frac{3}{8}$ in length; right pectoral with 3 or 4 rays, length about equal to diameter of eye .. 5. *macrolepis*.

Euryglossa was said to differ from *Brachirus* in having the nasal tube bifid. Mr. Chabanaud has examined Kaup's type in the Paris Museum, and kindly informs me that this condition is clearly abnormal, and that the specimen is in all other respects a typical *Brachirus orientalis*.

1. *Brachirus commersoni* (Lacep.)

? *Pleuronecte Commersonien*, Lacepède, *Hist. Nat. Poiss.*, III, pl. 12, fig. 2 (1802).¹
Brachirus commersoni, Swainson, *Nat. Hist. Fish.*, II, p. 303 (1839).

Synaptura commersoniana, Cantor, *J. Asiat. Soc. Bengal*, XVIII, pt. 2, p. 1204 (1850); Bleeker, *Verh. Bat. Gen.*, XXV, Bengal p. 76 (1853); Günther, *Cat. Fish.*, IV, p. 483 (1862); Bleeker, *Atl. Ichth.*, VI, p. 18, Pleuron, pl. iv, fig. 3 (1866); Day, *Fish. India*, p. 428, pl. xciv, fig. 1 (1877); Jenkins, *Mem. Ind. Mus.*, III, p. 29 (1910).

Solea russellii, Bleeker, *Nat. Tijdschr. Ned. Ind.*, I, p. 401 (1851); *Verh. Bat. Gen.*, XXIV, Pleuron, p. 15 (1852).

Synaptura commersoni, Jerdon, *Madras J. Lit. Sci.*, XVII, No. 39, p. 148 (1851) 1853.

Synaptura russellii, Bleeker, *Verh. Bat. Gen.*, XXV, Bengal, p. 76 (1853).

"*Jerree Potoo*" A, Russell, *Descr. Fish. Vizag.*, I, p. 55, pl. lxx (1803).

Depth of body $3\frac{3}{4}$ to $4\frac{1}{3}$ in the length, length of head $5\frac{1}{3}$ to $5\frac{1}{2}$. A bony prominence on the anterior part of the snout. Eyes separated by a rather narrow scaly interspace, the upper almost entirely in advance of the lower; diameter 6 to 8 in length of head. Cleft of mouth extending to below middle of eye; lower lip distinctly fringed. Two tubular nostrils on ocular side, in front of lower eye. Dorsal 70-81. Anal 58-66. Caudal 12. Posterior rays of dorsal and anal completely joined to the caudal, which is obtusely pointed. Right pectoral rounded, 5 to 6 in length of head; left pectoral equal to or somewhat larger than the right. Scales of ocular side ctenoid, those of blind side cycloid; about 160 in a longitudinal series; those on upper part of head and nape enlarged; many of those on blind side of head produced into barbel-like processes. Greyish brown; vertical fins blackish towards their edges on both sides, and with a conspicuous white margin; right pectoral dusky, with a pale margin posteriorly.

Described from 8 specimens, 160 to 320 mm. in total length, including an example of *B. russellii* from Dr. Bleeker's collection.

Hab.—Seas of India to the Malay Archipelago.

1150	..	S. Canara.	
259	..	.. Madras: near mouth of harbour.	Kemp.
795	..	.. Madras. ..	Day.
F. 2328/1.	..	.. Akyab Coast, Burma.	.. "Golden Crown."

Specimens in the British Museum from Karachi, Canara, and Madras.

¹ Not *Pleuronectes commersonii*, Lacepède, *Hist. Nat. Poiss.*, IV, pp. 599, 654 (1802).

2. *Brachirus albomaculatus* (Kaup).

Synaptura albomaculata, Kaup, *Arch. Naturg.*, 1858, p. 96; Günther, *Cat. Fish.*, IV, p. 483 (1862); Day, *Fish. India*, p. 429, pl. xciii, fig. 5 (1877).

Depth of body $3\frac{1}{2}$ to $3\frac{1}{2}$ in the length, length of head $5\frac{1}{4}$ to $5\frac{4}{5}$. A bony prominence on the anterior part of the snout. Eyes separated by a rather narrow scaly interspace, the upper almost entirely in advance of the lower; diameter about 6 in length of head. Cleft of mouth extending to a little beyond middle of eye; lower lip distinctly fringed. Two tubular nostrils on ocular side in front of lower eye; a small barbel between the nostrils. Dorsal 70-75. Anal 56-61. Caudal 16. Posterior rays of dorsal and anal completely joined to the caudal, which is obtusely pointed. Right pectoral rounded, $2\frac{1}{2}$ to $3\frac{1}{4}$ in length of head; left pectoral about equal to right. Scales of ocular side ctenoid, those of blind side cycloid; about 155 in a longitudinal series; those on upper side of head somewhat enlarged; many of those on blind side of head produced into barbel-like processes. Brownish, with 2 to 5 rows of widely separated white spots; vertical fins blackish towards their edges on both sides, and with a narrow white margin; right pectoral blackish, with a pale margin posteriorly.

Described from 7 specimens, 135 to 235 mm. in total length.

Hab.—Seas of India.

1149	..	..	Madras. ..	..	..	Day.
1498	..	..	Canara.			
— (2 spec.)		..	Puri, Orissa Coast.			
12703-4	..	..	Ganjam Coast, 7 to 10 fms.	..		"Investigator."
—	..	..	Sundarbans, mouth of R. Hughli.		Kemp.	
9297	..	..	Akyab, Burma.	..	..	Ireland.

Specimens in the British Museum from Canara; Coromandel Coast, Vizagapatam.

3. *Brachirus orientalis* (Bloch, Schneider).

Pleuronectes orientalis, Bloch, Schneider, *Syst. Ichth.*, p. 157 (1801).

Brachirus orientalis, Swainson, *Nat. Hist. Fish.*, II, p. 303 (1839).

Solea foliacea, Richardson, *Rep. Brit. Assoc. Adv. Sci.*, 1845 (1846), p. 279.

Solea pan, Bleeker, *Nat. Tijdschr. Ned. Ind.*, I, p. 410 (1851).

Synaptura pan, Bleeker, *Verh. Bat. Gen.*, XXIV, Pleuron, p. 30 (1852).

? *Solea trichodactylus*, Kaup, *Arch. Naturg.*, 1858, p. 95.

Euryglossa orientalis, Kaup, *t. c.* p. 99.

Synaptura foliacea, Günther, *Cat. Fish.*, IV, p. 481 (1862; Day, *Fish. Malabar*, p. 173 (1865).

Synaptura cinerascens, Günther, *t. c.* p. 482.

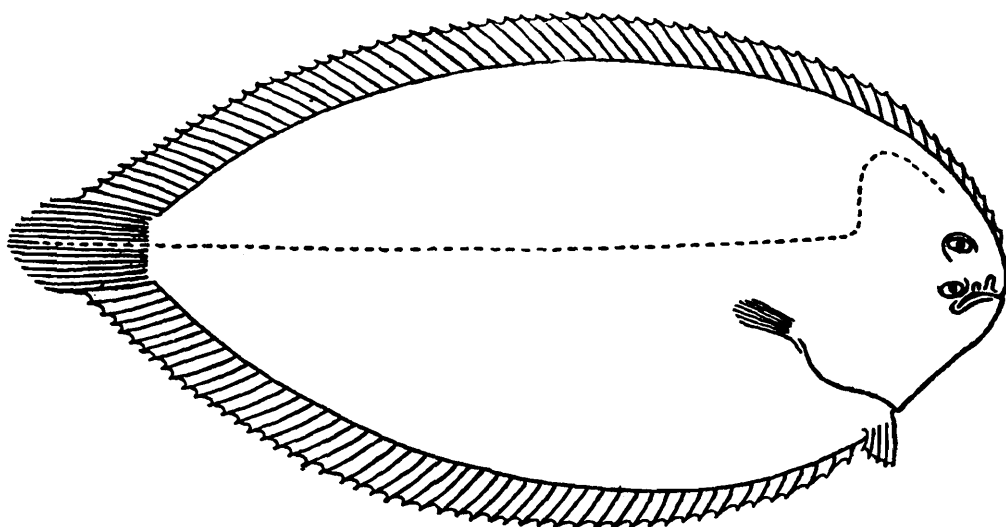
Synaptura orientalis, Günther, *t. c.* p. 484 (1862); Day, *Fish. India*, p. 429, pl. xciii, fig. 4, pl. xciv, fig. 2 (1877); Jenkins, *Mem. Ind. Mus.*, III, p. 29 (1910); Hora, *Mem. Ind. Mus.*, V, p. 759 (1923).

Brachirus sundaicus, Bleeker, *Atl. Ichth.*, VI, p. 20, Pleuron, pl. v, fig. 4, pl. viii, fig. 2 (1866).

Synaptura nigra, Macleay, *Proc. Linn. Soc. N. S. Wales*, V, p. 49 (1881); VI, p. 137 (1882).

Depth of body 2 to $2\frac{1}{4}$ in the length, length of head $4\frac{1}{4}$ to $5\frac{1}{3}$. Eyes separated by a rather wide scaly interspace, the upper in advance of the lower; diameter $1\frac{1}{2}$ to $2\frac{1}{2}$ in length of snout, 5 to 8 in length of head. Cleft of mouth extending to below middle of eye or not quite as far;

lower lip feebly fringed. Two tubular nostrils on ocular side in front of lower eye. Dorsal 62-72. Anal 47-57. Caudal 16. Posterior rays of dorsal and anal completely joined to the caudal, which is rounded. Right pectoral with 8 or 9 rays, rounded or obtusely pointed, length $2\frac{1}{3}$ to $3\frac{1}{2}$ in head; left pectoral somewhat smaller. Scales ctenoid on both sides of body; each scale on ocular side with a series of 12 or 13 spinules on the posterior edge; scales on upper part of head and nape not enlarged; some of those on blind side of head produced into barbel-like processes; 63 to 74 scales in a longitudinal series. Ocular side of body with a number of strong filamentous processes, which tend to form irregular groups. Greyish or brownish, generally blotched or irregularly spotted with darker; a number of short dark vertical streaks crossing the lateral line; groups of dermal filaments blackish; right pectoral dusky.



TEXT-FIG. 3.—Outline drawing of *Brachirus orientalis* (Bloch, Schneider). $\frac{2}{3}$ Nat. size.

Described from numerous specimens, 75 to 240 mm. in total length, including the type of *B. cinerascens*.

Hab.—From the Persian Gulf, through the Malay Peninsula and Archipelago to China and Australia.

F. 1841/1, F. 1830/1	..	Karachi.	..	..	Cumming.
457 (cat.), 1151-2	..	S. Canara.	..	..	Day.
1155	..	Canara.	..	..
F. 4179/1	..	Quilon, Travancore,	..	..	Trivandrum Mus.
F. 4186/1	..	Trivandrum, Travancore.	..	..	" "
1156	..	Malabar.			
796	..	Madras.			
1154	..	" ..	..	..	Day.
162	..	Ennur Backwater, Madras.	..	..	Annandale.
264	..	Chilka Lake.	..	..	Chilka Survey.
1153	..	Cochin.	..	..	Day.

Specimens in the British Museum from the Persian Gulf; Sind; Calicut; Madras; Travancore; Ceylon; Malabar; Cochin.

This species may be distinguished from *B. aspilos*, Bleeker, (= *B. heterolepis*, Bleeker) by the ctenoid scales on the blind side.

4. *Brachirus pan* (Ham. Buch.).

Pleuronectes pan, Hamilton (Buchanan), *Fish. Ganges*, pp. 130, 373, pl. xxiv, fig. 42 (1822).

Brachirus pan, Swainson, *Nat. Hist. Fish.*, II, p. 303 (1839); Bleeker, *Atl. Ichth.*, VI, p. 21, Pleuron, pl. ix, fig. 1 (1866).

Pleuronectes canus, Gray, *Cat. Fish. Gronow*, p. 91 (1854).

Synaptura pan, Günther, *Cat. Fish.*, IV, p. 481 (1862); Day, *Fish. India*, p. 429, pl. xciii, fig. 3 (1877).

Depth of body 2 to $2\frac{1}{4}$ in the length, length of head $4\frac{1}{5}$ to 5. Eyes separated by a scaly interspace of moderate width, the upper in advance of the lower; diameter 5 to 6 in length of head. Cleft of mouth extending to below anterior part of eye; lower lip feebly fringed. Two tubular nostrils on ocular side in front of lower eye. Dorsal 57-61. Anal 43-46. Caudal 14. Posterior rays of dorsal and anal more or less completely joined to the caudal, which is obtusely pointed. Right pectoral with 7 or 8 rays, pointed, length 3 to $3\frac{1}{3}$ in head; left pectoral somewhat smaller. Scales ctenoid on both sides of body, those on upper part of head and nape distinctly enlarged; some of those on blind of head produced into barbel-like processes; 66 to 72 scales in a longitudinal series. A few dermal filaments on ocular side of body. Greyish or brownish, spotted and blotched with darker; generally some short dark vertical streaks crossing the lateral line; margin of right pectoral blackish.

Described from several specimens, 50 to 165 mm. in total length.

Hab.—Estuaries and tidal rivers of Orissa; Ganges delta; rivers of Burma; Malay Peninsula and Archipelago.

456 (Cat.) (5 spec.)	..	Calcutta Bazaar.		
1496	..	R. Hughli.	..	Day.
13829-42	..	Santipur Marshes, R. Hughli.	..	Alcock.
— (9 spec.)	..	Sundarbans, mouth of R. Hughli.		Kemp.
148	..	Sittang River, Burma.	..	Day.

5. *Brachirus macrolepis* (Bleeker).

(Plate IV.)

Synaptura macrolepis, Bleeker, *Act. Soc. Sci. Indo-Neerl.*, V, p. 7 (1858-9); Günther, *Cat. Fish.*, IV, p. 486 (1862).

Brachirus macrolepis, Bleeker, *Atl. Ichth.*, p. 20, Pleuron, pl. v, fig. 3 (1866).

Depth of body $2\frac{2}{3}$ in the length, length of head a little more than 4. Eyes very small, contiguous, the upper a little in advance of the lower; diameter about 11 in length of head. Cleft of mouth extending to below anterior part of eye; lower lip feebly fringed. Both nostrils on ocular side close together in front of eyes; the anterior nostril tubular, the posterior with a membranous flap. Dorsal (68) 69-70. Anal (51) 52. Caudal 16. Posterior rays of dorsal and anal completely joined to the caudal, which is pointed. Right pectoral with 3 or 4 rays, length about equal to diameter of eye; left pectoral a little larger. Scales ctenoid on both sides of body, those on upper part of head and nape enlarged; 63 scales in a longitudinal series. Uniform pale brownish.

Described from a single specimen, 135 mm. in total length.

Hab.—Coast of Orissa; Borneo.

—	Balasore Bay, Orissa.
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3. *Soleichthys* Bleeker.

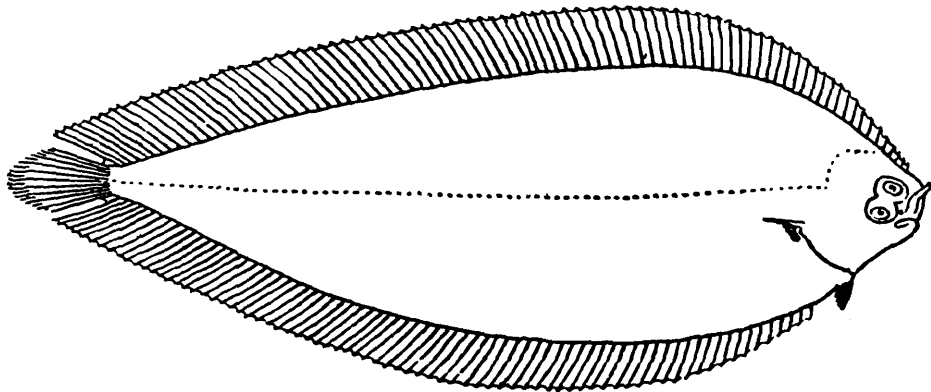
Soleichthys, Bleeker, *Act. Soc. Sci. Indo-Neerl.*, VI, p. 183 (1859); McCulloch, *Austral. Zool.*, I, p. 90 (1917).

Several species from the Indo-Pacific; one known from India.

1. *Soleichthys heterorhinos* (Bleeker).

- Solea heterorhinos*, Bleeker, *Act. Soc. Sci. Indo-Neerl.*, I, Amboina, p. 64 (1856); *Atl. Ichth.*, VI, p. 17, Pleuron, pl. ix, fig. 2 (1866).
 ? *Aesopia multifasciata*, Kaup, *Arch. Naturg.*, p. 97 (1858).
Soleichthys heterorhinos, Bleeker, *Act. Soc. Sci. Indo-Neerl.*, VIII, Amboina, p. 14 (1860); Norman, *Biol. Res. "Endeavour"*, V, p. 286 (1926).
Solea heterorhina, Günther, *Cat. Fish.*, IV, p. 466 (1862); Kner, *Denkschr. K. Ak. Wiss. Wien.*, XXIV, p. 8, pl. iii, fig. 2 (1865); Day, *Fish. India*, p. 426, pl. xcii, fig. 5 (1877); Günther, *Fische Sudsee*, VIII, p. 345 (1909).
Solea nigrostriolata, Steindachner and Kner, *Sitzber. K. Ak. Wiss. Wien*, LXI, Abt. 1, p. 427, pl. i, fig. 2 (1870).
 ? *Solea lineata*, Ramsay, *Proc. Linn. Soc. N. S. Wales*, VII, p. 406 (1883).
 ? *Synaptura multifasciata*, Günther, *Cat. Fish.*, IV, p. 485 (1862); Day, *Fish. India*, p. 430 (1877).

Depth of body 3 to $3\frac{1}{2}$ in the length, length of head $5\frac{2}{3}$ to $6\frac{2}{3}$. Eyes contiguous, diameter greater than snout and $3\frac{1}{2}$ to 4 in length of head. Dorsal 87-98. Anal 78-85. Right pectoral with the upper rays produced, length $1\frac{3}{5}$ to $2\frac{3}{5}$ in head; left pectoral very short. About 110 scales in a longitudinal series.



TEXT-FIG. 4.—Outline drawing of *Soleichthys heterorhinos* (Bleeker). $\frac{3}{4}$ Nat. size.

Described from 7 specimens, 80 to 130 mm. in total length.

Hab.—From the Andaman Islands, through the Indo-Australian Archipelago to Australia and the Pacific.

1444 Andamans.

Soleichthys tubifera, Peters, from Mauritius, is very close to this species, but has fewer anal rays and a different colouration. *S. microcephalus*, Günther, from Australia, may be distinguished from *S. heterorhinos* by the larger head, larger scales, fewer anal rays, and by the different colouration.

4. *Zebrias* Jordan and Snyder.

Zebias, Jordan and Snyder, *Proc. U. S. Nat. Mus.*, XXIII, p. 380 (1900); Jordan & Starks, *ibid.*, XXXI, p. 232 (1906).

Several species from the Indo-Pacific; three known from India.

Synopsis of the Indian Species.

- I Scales strongly ctenoid, each with a single series of strong spinules on the posterior edge; 66 to 71 scales in a longitudinal series; dorsal with 69 to 74 rays; anal with 59 to 63 rays; posterior rays of dorsal and anal joined to basal half of caudal .. 1. *synapturoides*.
- II. Scales moderately ctenoid, the marginal spinules much shorer; posterior rays of dorsal and anal fins more or less completely joined to caudal.
- A. Eyes with tentacles; dorsal with 67 to 73 rays; anal with 56 to 61 rays; right pectoral $2\frac{1}{2}$ to $3\frac{1}{4}$ in head; 92 to 99 scales in a longitudinal series; each scale with several series of spinules posteriorly. .. 2. *quagga*.
- B. Eyes without tentacles; dorsal with 79 to 83 rays; anal with 65 to 71 rays; right pectoral 6 to 8 in head; 105 to 112 scales in a longitudinal series; each scale with one (or two) series of spinules posteriorly.. .. 3. *altipinnis*.

1. *Zebrias synapturoides* (Jenkins).

(Plate V.)

? *Solea jerreus*, Cuvier, *Régne Anim.*, ed. 2, II, p. 343 (1829).? *Brachirus jerreus*, Swainson, *Nat. Hist. Fish.*, II, p. 303 (1839).*Synaptura quagga* (part), Günther, *Cat. Fish.*, IV, p. 485 (1862).*Synaptura synapturoides*, Jenkins, *Mem. Ind., Mus.*, III, p. 28, pl. iii, fig. 4 (1910).? " *Jerre Potoo* " B, Russell, *Descr. Fish. Vizag.*, I, p. 56, pl. lxxi (1803).

Depth of body $2\frac{2}{3}$ to $2\frac{4}{5}$ in the length, length of head $4\frac{1}{5}$ to 5. Eyes nearly contiguous, the upper a little in advance of the lower; diameter a little greater than length of snout and $4\frac{1}{2}$ to 5 in length of head; eyes without tentacles. Mouth extending to below middle of eye or not quite as far. Nasal tube rather short. Dorsal 69-76. Anal 59-63. Caudal 18. Posterior rays of dorsal and anal joined to the basal half of the caudal, which is quite distinct and rounded. Right pectoral shorter than eye, the upper rays not produced; left pectoral rather smaller. Scales strongly ctenoid on both sides of body; each scale with a single series of 10 to 12 strong spinules on the posterior margin; some of those on blind side of head produced into barbel-like processes; 66 to 71 scales in a longitudinal series. Greyish, with a number of dark brown cross-bands arranged as in the accompanying figure and extending on to the vertical fins; posterior part of caudal with a circular area of dark brown, margined with yellowish white, and with a number of yellowish white spots and blotches in the centre.

Described from 8 specimens, 90 to 130 mm. in total length.

Hab.—Madras and Ganjam Coasts.

F. 3430/1 (One of the types)	Ganjam Coast, 24 to 30 fms.	..	" Investigator."
12911-6	.. .. 30 to 35 fms.	..	"
F. 826/1	.. Off Malabar Coast, 68 fms.	..	"

Solea jerreus, Cuvier, was based on the fish described and figured by Russell as " *Jerree Potoo* " B, which may be this species. Russell describes the dorsal and anal fins as being continued to the caudal but not coalescing with it.

2. *Zebrias quagga* (Kaup).

(Plate VI.)

Aesopia quagga, Kaup. *Arch. Naturg.*, 1858, p. 98.*Synaptura quagga* (part), Günther, *Cat. Fish.*, IV, p. 485 (1862).*Synaptura zebra*, Day, *Fish. India*, p. 430, pl. xciv, fig. 3 (1877).*Synaptura quagga*, Alcock, *Ann. Mag. Nat. Hist.*, (6) VI, p. 440 (1890); *J. Asiat. Soc. Bengal*, LXV, pt. 2, p. 329 (1896).? *Synaptura zebra*, Regan, *J. Bombay N. H. Soc.*, XVI, p. 330 (1905).

Depth of body $2\frac{1}{2}$ to $2\frac{3}{4}$ in the length, length of head $4\frac{4}{5}$ to $5\frac{1}{5}$. Eyes practically contiguous, the upper a little in advance of the lower; diameter a little greater than length of snout and 4 to 5 in length of head; each eye with a small membranous tentacle. Mouth extending to below anterior part of eye. Nasal tube short. Dorsal 66-73. Anal 56-61. Caudal 16-18. Posterior rays of dorsal and anal more or less completely joined to the caudal, which is scarcely distinct and rounded posteriorly. The upper rays of the right pectoral produced, $2\frac{1}{2}$ to $3\frac{1}{4}$ in length of head; left pectoral rather smaller. Scales moderately ctenoid on both sides of body; each scale with several series of small spinules posteriorly; some of those on blind side of head produced into barbel-like processes; 92 to 99 scales in a longitudinal series. Pale brownish or greyish, with a number of dark brown cross-bands arranged as in the accompanying figure and extending on to the vertical fins; caudal fin irregularly marked with yellowish white and black.

Described from 9 specimens, 80 to 135 mm. in total length.

Hab.—Persian Gulf (?); Seas of India, through the Malay Peninsula and Archipelago to China.

1497 Madras.

12234, 12312, 12315-7 .. Orissa Coast, 7 to 10 fms. .. "Investigator."

Specimens in the British Museum from the Persian Gulf; Bombay; Madras.

The specimens from the Persian Gulf agree closely with those described above, but the orbital tentacles are absent, and the form and arrangement of the cross-bands is different. They may represent a new species, but as all my examples are immature I do not feel justified in describing them as such.

3. *Zebrias altipinnis* (Alcock).

(Plate VII.)

Synaptura altipinnis, Alcock, *Ann. Mag. Nat. Hist.*, (6) VI, p. 441 (1890); Jenkins, *Mem. Ind. Mus.*, III, p. 29 (1910).

Depth of body $2\frac{2}{5}$ to $2\frac{3}{5}$ in the length, length of head $4\frac{3}{5}$ to 5. Eyes nearly contiguous, the upper a little in advance of the lower; diameter equal to or less than length of snout and 5 to $6\frac{1}{4}$ in length of head; eyes without tentacles. Mouth extending to below middle or anterior part of eye. Nasal tube rather short. Dorsal 79-83. Anal 64-71. Caudal 18. Posterior rays of dorsal and anal completely joined to the caudal, which is not distinct and obtusely pointed posteriorly. The upper rays of the right pectoral not produced, 6 to 8 in length of head; left pectoral about the same size. Scales moderately ctenoid on both sides of body;

each scale with one (sometimes two) series of small spinules posteriorly some of those on blind side of head produced into barbel-like processes 105 to 112 scales in a longitudinal series. Pale brownish or greyish, with a number of dark brown cross-bands arranged as in the accompanying figure and extending on to the vertical fins; caudal fin dark brown, with 2 or 3 large yellowish white spots.

Described from 9 specimens, 80 to 245 mm. in total length.

Hab.—East coast of India to the Malay Peninsula and Archipelago.

12177	Orissa Coast, 7 to 10 fms.	..	"Investigator."
224	Ganjam Coast, 25 to 35 fms.		"
F. 2472/1	.. " " 24 to 30 fms.	..	"Golden Crown."
254	.. Sandheads, mouth of R. Hughli	..	P. V. "Lady Fraser."
— (2 spec).	" " " " "	..	"
—	.. Bay of Bengal, between Pilot Ridge Light Vessel and Eastern Channel.		"
256	.. Stn. 395; off Tenasserim Coast, Burma.		"Investigator."
F. 5804-1	.. Off Arakan Coast, Burma.	..	"Golden Crown."
—	.. ??		

This species may be distinguished from *Z. zebra*, Bloch, by the deeper body, larger head, short sub-equal pectorals, and by the form and arrangement of the cross-bands.

5. *Aesopia* Kaup.

Aesopia, Kaup, *Arch. Naturg.*, 1858, p. 97; Günther, *Cat. Fish.*, IV, p. 487 (1862).

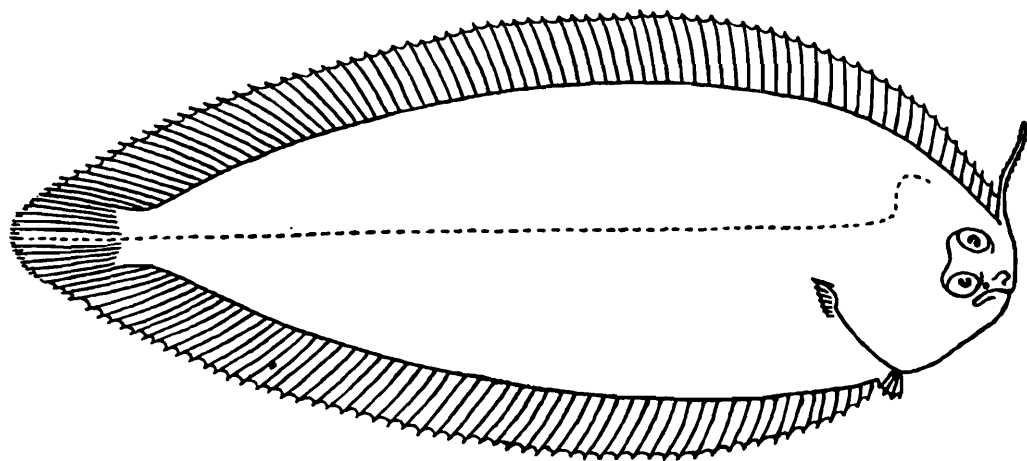
A single species.

1. *Aesopia cornuta* Kaup.

Synaptura potoo, Bleeker, *Verh. Bat. Gen.*, XXV, Bengal, p. 76 (1853).
Aesopia cornuta, (Cuvier) Kaup, *Arch. Naturg.*, 1858, p. 98; Günther, *Cat. Fish.*, IV, p. 487 (1862); Day, *Proc. Zool. Soc.*, 1873, p. 238; Jordan & Starks, *Proc. U. S. Nat. Mus.*, XXXI, p. 235, fig. 27 (1906); Regan, *Ann. Durban Mus.*, II, p. 218 (1920); Barnard, *Ann. S. Afric. Mus.*, XXI, p. 409 (1925).
Synaptura cornuta, Day, *Fish. India*, p. 430, pl. xciv, fig. 4 (1877); Alcock, *J. Asiat. Soc. Bengal*, LVIII, pt. 2, p. 287 (1889); Johnstone, *Ceylon Pearl Oyster Fish.*, Supp. Rep. XV, p. 206 (1904); Jenkins, *Mem. Ind. Mus.*, III, p. 29 (1910).
 "Jerree Potoo" C. Russell, *Descr. Fish. Vizag*, I, p. 56, pl. lxxii (1803).

Depth of body about 3 in the length, length of head 5 to 5½. Eyes contiguous, the upper scarcely in advance of the lower; diameter greater than length of snout and about 4 in length of head. Mouth extending to below anterior part of eye. Nasal tube rather short. Dorsal 69-79. Anal 61-66. Caudal 15-17. Posterior rays of dorsal and anal completely joined to the caudal. Right pectoral shorter than eye, the upper rays not produced; left pectoral about the same size. Scales cycloid on both sides of body; some of those on blind side of head produced into barbel-like processes; 87 to 98 scales in a longitudinal series. Greyish or brownish, with 13 dark brown cross-bands extending on to the vertica

fins, the anterior band being on the snout ; caudal dark brown posteriorly, with some oblong white spots.



TEXT-FIG. 5.—Outline drawing of *Aesopia cornuta* Kaup. $\frac{2}{3}$ Nat. size.

Described from 10 specimens, 55 to 130 mm. in total length.

Hab.—South Africa to Japan.

798	..	..	Madras.	
12707, 12710	..	..	Ganjam Coast, 9 to 10 fms.	.. "Investigator."
12233	..	..	Orissa Coast, 7 to 8 fms.	.. "
F. 825/1	..	..	Off Martaban Coast, 68 fms.	.. "

Specimens in the British Museum from Madras, and the Ganjam Coast ; in the Herdman Collection from Galle, Ceylon.

I have been unable to find any trace of the "*Solea cornuta*" attributed to Cuvier. In the second edition of the *Règne Animalium* Vol. II he lists "la sole cornue" in a footnote on page 343, and refers to Russell's figure, but does not give a specific name. The name *Solea cornuta*, Cuvier, is not to be found in Sherborn's "*Index Animalium*," and probably does not exist.

6. *Pardachirus* Günther.

Pardachirus, Günther, *Cat. Fish.*, IV, p. 478 (1862).

Four species from the Indo-Pacific ; two known from India.¹

1. *Pardachirus marmoratus* (Lacep.).

? *Achirus barbatus*, Lacepède, *Hist. Nat. Poiss.*, IV, pp. 658, 660 (1802).

Achirus marmoratus, Lacepède, *t. c.*, pp. 658, 660.

Achirus barbatus, Geoffroy, *Ann. Mus. H. N. Paris*, I, p. 152, pl. xi (1802) ; Rüppell, *Fische roth. Meeres*, p. 122, pl. 31, fig. 2 (1828).

Pardachirus marmoratus, Günther, *Cat. Fish.*, IV, p. 478 (1862) ; Sauvage, *H. Nat. Poiss. Madagascar*, p. 472 (1891) ; Barnard, *Ann. S. Afric. Mus.*, XXI, p. 405 (1925).

Depth of body $2\frac{1}{4}$ to $2\frac{1}{2}$ in the length, length of head $4\frac{1}{4}$ to $4\frac{2}{3}$. Dorsal 66-70. Anal 52-55. About 95 scales in a longitudinal series ; each scale on ocular side of head with a roughened patch posteriorly, but without marginal spinules. Brownish, with a number of rather indistinct rounded or irregular pale, dark-edged areas, with or without a dark central spot ;

¹ I am unable to recognise *Pleuronectes maculatus*, Bloch, the type of which was re-examined by Day (*Fish. India*, p. 427), who regarded it as congeneric with *Pardachirus pavoninus*. It is doubtful whether this is a true *Pardachirus*. The type, a skin preserved in the Berlin Museum, was said to come from Tranquebar.

head, body and fins with numerous small dark spots in addition to the other markings ; sometimes a few large black and white ocelli on the body.

Described from 8 specimens, 85 to 215 mm. in total length.

Hab.—Red Sea ; East coast of Africa southwards to Madagascar ; Persian Gulf ; Gulf of Oman.

265. (2 spec.)

Persian Gulf

"Palinurus."

A specimen in the British Museum from Muscat, Arabia.

2. *Pardachirus pavoninus* (Lacep.).

Achirus pavoninus, Lacepède, *Hist. Nat. Poiss.*, IV, pp. 658, 660 (1802) ; Cantor, *J. Asiat. Soc. Bengal*, XVIII, pt. 2, p. 1207 (1850) ; Bleeker, *Atl. Ichth.*, VI, p. 24, Pleuron, pl. x, fig. 1 (1866) ; Day, *Fish. India*, p. 427, pl. xciii, fig. 2 (1877).

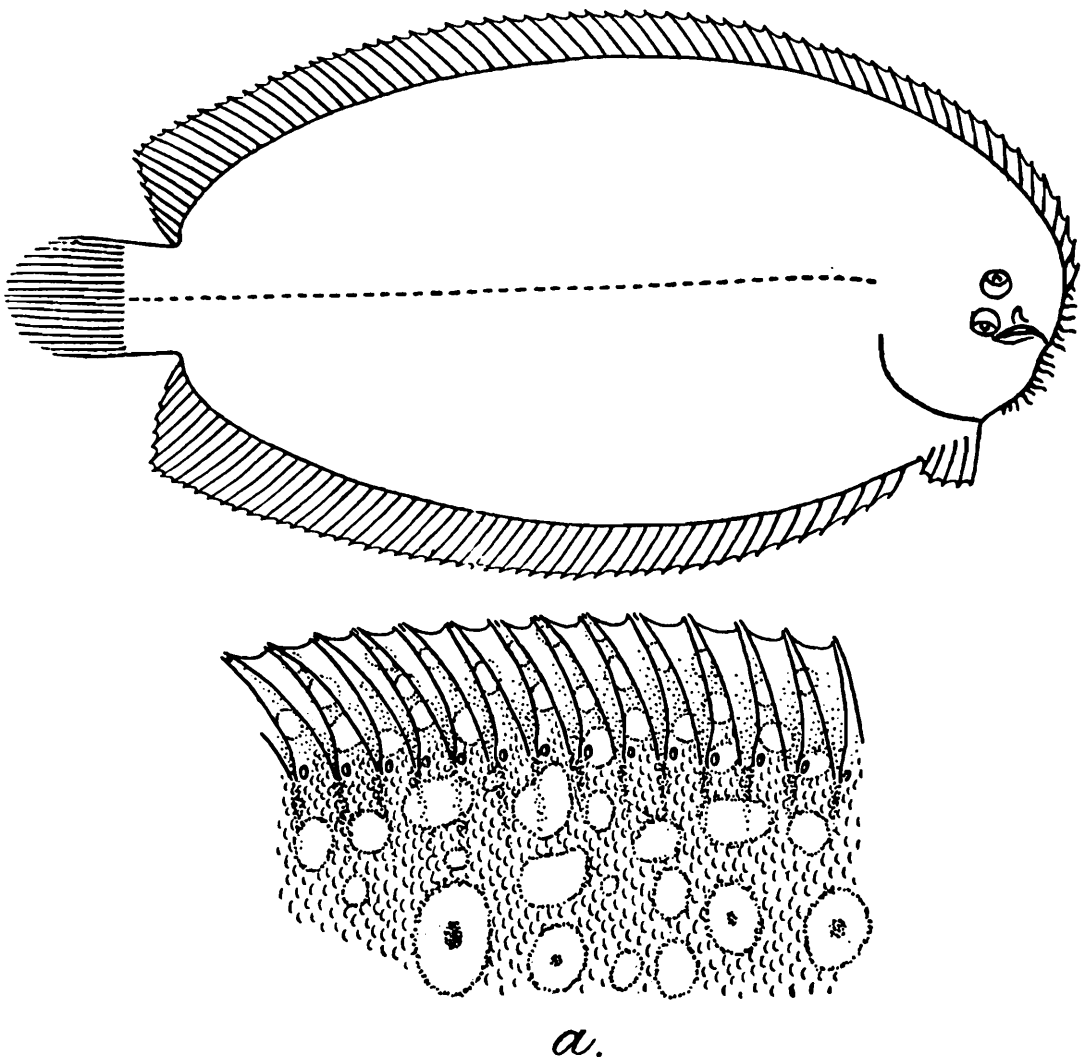
Achirus maculatus, Bleeker, *Nat. & Geneesk. Arch. Ned. Ind.*, II, p. 509 (1845).

Pardachirus pavoninus, Günther, *Cat. Fish.*, IV, p. 479 (1862) ; *Fische Sudsee*, VIII, p. 347 (1909) ; Weber, "*Siboga*"-*Exped. Monogr.* 57, p. 439 (1913) ; Ogilby, *Mem. Queensland Mus.*, V, p. 142, pl. xvi (1916), ; Norman, *Biol. Res. "Endeavour"*, V, p. 288 (1926).

? *Pardachirus marmoratus*, Kner, *Reise "Novara," Zool.* I, 5, *Fische*, p. 290 (1869).

Solea persimilis, Günther, *Fische Sudsee*, VIII, p. 346 (1909).

Depth of body $2\frac{1}{3}$ to $2\frac{1}{2}$ in the length, length of head $4\frac{1}{2}$ to nearly 5. Dorsal 64-71. Anal 50-56. 78 to 85 scales in a longitudinal series ; each



TEXT-FIG. 6.—Outline drawing of *Pardachirus pavoninus* (Lacep.). $\frac{2}{3}$ Nat. size. (a) Portion of dorsal fin of same, showing the pores near the bases of the rays.

scale on ocular side of head with a roughened patch posteriorly and with a series of marginal spinules. Greyish brown, with a number of rounded

or irregular milk-white blotches and spots, margined with dark brown or black and with or without a dark central spot ; these markings extend on to the fins.

Described from several specimens, 105 to 195 mm. in total length, including the type of *Solea persimilis*.

Hab.—Andaman Islands, through the Malay Peninsula and Archipelago to Japan, Australia and the Pacific.

455 (Cat.)	..	..	??	.
1259	..	..	Andaman Is.		
9490	..	..	„	..	Homfrey.

The four species of *Pardachirus* may be distinguished as follows :—

- I. Anal with 50 to 56 rays ; 80 to 100 scales in a longitudinal series.
 - A. Scales on ocular side of head without marginal spinules 1. *marmoratus*, Lacep.
 - B. Scales on ocular side of head with marginal spinules.
 1. Scales on body with the marginal spinules feebly developed or absent ; right pelvic fin separated from anal by a narrow space which is less than diameter of eye, joined by a membrane to the urino-genital papilla ; body without dark blotches .. 2. *pavoninus*, Lacep.
 2. Scales on body with the marginal spinules well developed ; right pelvic fin separated from anal by a space which is greater than diameter of eye, not joined to the urino-genital papilla ; 3 series of black blotches on body in addition to the usual ocelli .. 3. *hedleyi*, Ogilby.
- II. Anal with 44 to 47 rays ; 60 to 70 scales in a longitudinal series 4. *poropterus*, Bleeker.
[=*thepassii*, Bleeker].

7. *Aseraggodes* Kaup.

Aseraggodes, Kaup, *Arch. Naturg.*, 1858, p. 103.

Liachirus, Günther, *Cat. Fish.*, IV, p. 479 (1862).

Several species from the Indo-Pacific ; one known from India.

1. *Aseraggodes cyaneus* (Alcock).

Solea cyanea, Alcock, *Ann. Mag. Nat. Hist.* (6) VI, p. 439 (1890).

Solea umbratilis, Alcock, *J. Asiat. Soc. Bengal*, LXIII, pt. 2, p. 131, pl. vii, fig. 3 (1894).

Solea umbratilis, Alcock, *Illust. Zool. "Investigator,"* Fishes pl. xv, fig. 4 (1895) ; *Cat. Indian Deep-Sea Fishes*, p. 129 (1899) ; Regan, *J. Bombay Nat. Hist. Soc.*, XVI, p. 329 (1905).

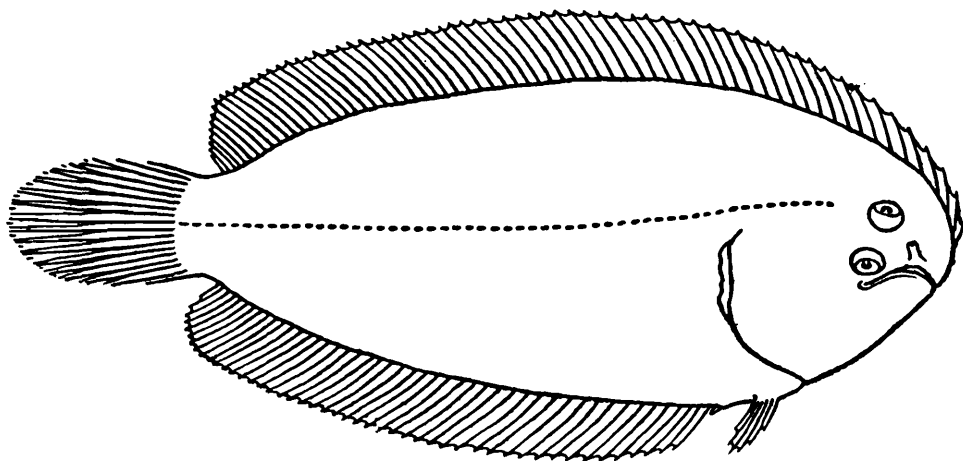
Solea (Achirus) cyanea, Alcock, *J. Asiat. Soc. Bengal*, LXV, pt. 2, p. 329 (1896).
Solea (Achirus) umbratilis, Alcock, *t. c.* p. 329.

? *Achirus poropterus*, Regan, *Trans. Linn. Soc., Zool.*, XII, p. 235 (1908).

Aseraggodes cyaneus, Weber, "*Siboga*"-*Exped. Monogr.* 57, p. 435, pl. xi, fig. 3 (1913).

Depth of body $2\frac{1}{4}$ to $2\frac{3}{5}$ in the length, length of head $2\frac{3}{4}$ to $4\frac{2}{5}$. Upper eye in advance of lower, its diameter $\frac{1}{2}$ or more than $\frac{1}{2}$ length of snout, greater than interorbital width, and 6 to 8 in length of head. Mouth extending to below middle of eye or beyond ; distance from angle of mouth

to tip of lower jaw 3 to $3\frac{1}{2}$ in length of head. Dorsal 67-77. Anal 46-54. Scales ctenoid on both sides of body; 58 to 66 in a longitudinal series. Greyish or brownish, with some large darker blotches arranged in four or five irregular transverse series and in three irregular longitudinal series; dorsal and anal fins generally with dark brown or blackish punctulations on the membrane between the rays.



TEXT-FIG. 7.—Outline drawing of *Aseraggodes cyaneus* (Alcock). Nat. size.

Described from numerous examples, 60 to 100 mm. in total length, including paratypes of the species and of *A. umbratilis*.

Hab.—From the Persian Gulf, through the Indian Ocean and Archipelago to the Timor Sea.

F. 1006-9/1 ..	..	Stn. 292 : Persian Gulf, 53 fms. ..	" Investigator."
F. 1152-4/1 ..	..	„ 346 : „ 47 fms. ..	„
F. 1017-8/1 ..	..	„ 294 : „ 40 fms. ..	„
9401 ..	..	Persian Gulf. ..	Blanford.
F. 1297-9/1	..	Stn. 360 : Arabian Sea, 130 fms.	" Investigator."
F. 50-54/1 ..	..	Off Kathiawar Coast, 82 fms. ..	„
F. 631-42/1 ..	..	Stn. 246 : Laccadive Sea, 68 to 148 fms.	„
F. 595-630/1 ..	..	N. W. of Calicut, 100 fms. ..	„
F. 6834-6/1 (6 spec.)	..	Stn. 389 : off Travancore Coast, 81 fms.	„
12919 }	(Paratypes of <i>A. cyaneus</i>).	Stn. 79 : Ganjam Coast, 33 fms. ..	„
12920 }		Stn. 93 : Vizagapatam Coast, 25 fms.	„
12921 }		„	„
		Stn. 98, Vizagapatam Coast, 20 fms.	„
13615, 13617, 13621-2	..	Stn. 170 : Bay of Bengal, 107 fms.	„
13623, 13625-8	..	Stn. 169 : Bay of Bengal, 91 fms.	„

Specimens in the British Museum from Gulf of Oman, 98 fms.; off Muscat, 220 fms.; Bay of Bengal, 107 fms. A young example collected by Gardiner in the Maldives may belong to this species.

After examining and tabulating a large series of specimens from various localities, I conclude that *A. umbratilis* is synonymous with *A. cyaneus*, or, at the most, only a variety. It is said to differ in the larger head and mouth, larger and more widely separated eyes, and in the smaller number of dorsal and anal rays: none of these characters, however, appear to be constant.

8. *Heteromycteris* Kaup.

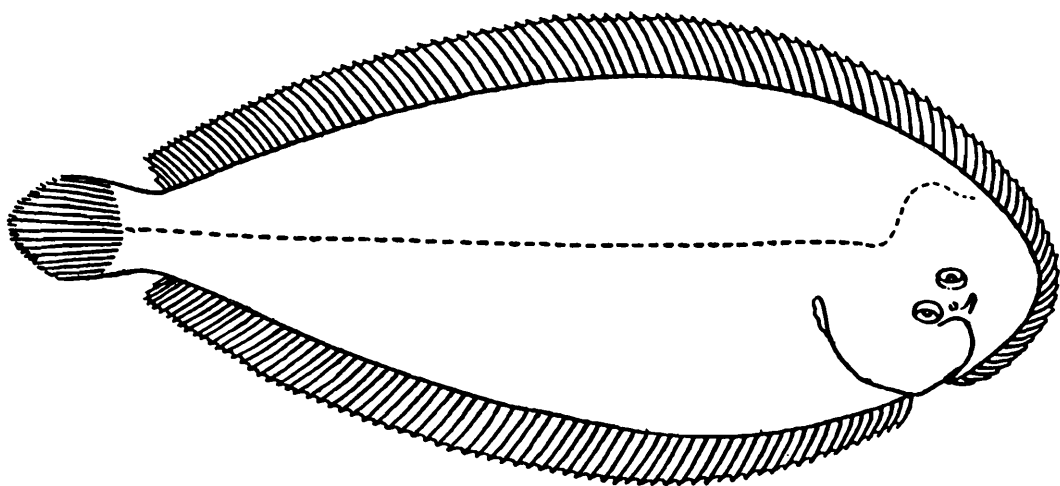
Heteromycteris, Kaup, *Arch. Naturg.*, 1858, p. 103 ; Jordan, *Copeia*, No. 136, p. 99 (1924) ; Chabanaud, *Ann. Mag. Nat. Hist.* (9) XX, p. 523 (1927).
Amate, Jordan & Starks, *Proc. U. S. Nat. Mus.*, XXXI, p. 228 (1906) ; Jordan, *Univ. Calif. Publ. Zool.*, XXVI, No. 1, p. 11 (1923).
Monodichthys, Chabanaud, *Bull. Mus. Nat. Hist. Paris*, 1925, p. 356.

Four species from the Indo-Pacific ; one known from India.

1. *Heteromycteris oculus* (Alcock).

Solea oculus, Alcock, *J. Asiat. Soc. Bengal*, LVIII, pt. 2, p. 285, pl. xviii, fig. 3 (1889) ; Johnstone, *Ceylon Pearl Oyster Fish.*, Supp. Rep. XV, p. 206 (1904).
Solea (Achirus) oculus, Alcock, *J. Asiat. Soc. Bengal*, LXV, pt. 2, p. 329 (1896).
Heteromycteris oculus, Chabanaud, *Ann. Mag. Nat. Hist.* (9) XX, p. 526 (1927).

Depth of body $2\frac{3}{5}$ to nearly 3 in the length, length of head $3\frac{3}{4}$ to $4\frac{1}{4}$.
 Dorsal 90-103. Anal 60-67. 86 to 91 scales in a longitudinal series.



TEXT-FIG. 8.—Outline drawing of *Heteromycteris oculus* (Alcock). $\frac{2}{3}$ Nat. size.

Described from several specimens, 64 to 145 mm. in total length.

Hab.—Mekran, Ganjam and Orissa Coasts ; Ceylon.

14274-8	..	Mekran Coast.	..	..	Townsend.
12591-3, 12595, 12597,		Ganjam Coast, 9 to 14 fms.	..	..	"Investigator."
12599, 12601-12, 12705-6.					
F. 2688/1	..	..	Puri Coast, Orissa.	..	Annandale.
—	..	..	Sundarbans, mouth of R. Hughli.	Kemp.	

This species is very close to *H. hartzfeldii*, Bleeker, but appears to differ in the absence of scales on the rays of the dorsal and anal fins, on the ocular side, and in the colouration.

Family 5. *Cynoglossidae*.

Three genera represented in Indian waters.

Synopsis of the Indian Genera.

- | | | |
|---|----|-----------------------------|
| I. Two or three lateral lines on ocular side. | | |
| A. Lips fringed | .. | .. 1. <i>Paraplagusia</i> . |
| B. Lips not fringed. | | 2. <i>Cynoglossus</i> . |
| II. No lateral lines on ocular side | .. | .. 3. <i>Symphurus</i> . |

1. *Paraplagusia* Bleeker.

Paraplagusia, Bleeker, *Nat. Tijdschr. Dierk.*, II, p. 274 (1865); *Atl. Ichth.*, VI, p. 26 (1866).

Several species from the Indo-Pacific; two known from India.

Synopsis of the Indian Species.

- | | |
|---|-----------------------|
| I. Posterior edge of rostral hook $2\frac{1}{4}$ to $2\frac{3}{4}$ in head ;
dorsal with 106 to 118 rays ; anal with 86 to 93
rays ; 98 to 114 scales in a longitudinal series, 16
to 19 between lateral lines | 1. <i>bilineata</i> . |
| II. Posterior edge of rostral hook 3 to $3\frac{1}{2}$ in head ;
dorsal with 99 to 104 rays ; anal with 76 to 82
rays ; 75 to 83 scales in a longitudinal series, 13 to
16 between lateral lines | 2. <i>blochii</i> . |

1. *Paraplagusia bilineata* (Bloch).

Pleuronectes bilineatus, Bloch, *Nat. Ausland. Fische*, III, p. 29 (1785); Bloch, Schneider, *Syst. Ichth.*, p. 158 (1801); Cuvier, *Règne Anim.*, ed. 1, II, p. 224 (1817).

? *Plagusia dipterygia*, Rüppell, *Fische roth. Meeres*, p. 123, pl. 31, fig. 3 (1828).

Plagusia marmorata, Bleeker, *Nat. Tijdschr. Ned. Ind.*, I, p. 411 (1851); *Verh.*

Bat. Gen., XXIV, Pleuron, p. 20 (1852); Günther, *Cat. Fish.*, IV, p. 491 (1862); Day, *Fish. India*, p. 431, pl. xcv, fig. 1 (1877); Jenkins, *Mem. Ind. Mus.*, III, p. 29 (1910).

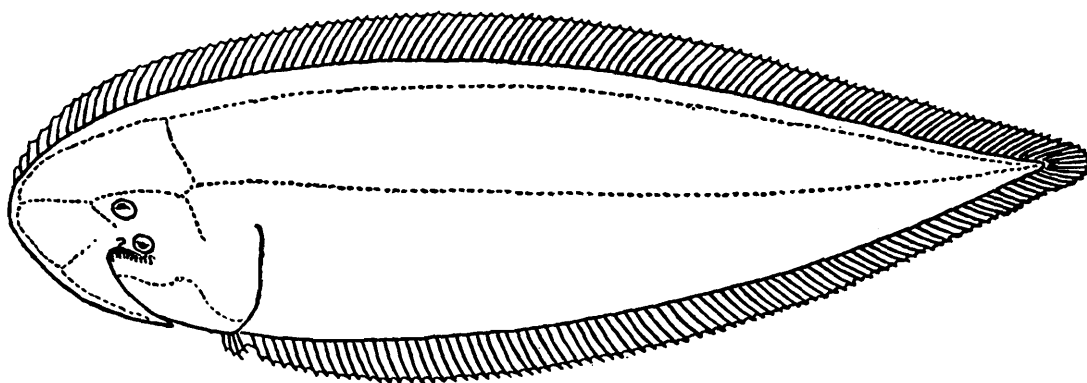
Paraplagusia marmorata, Bleeker, *Atl. Ichth.*, VI, p. 28, Pleuron, pl. xv, fig. 5 (1866); *Verh. Akad. Amsterdam*, XVIII, p. 22 (1879); Regan, *Ann. Durban Mus.*, II, p. 219 (1920); Barnard, *Ann. S. Afric. Mus.*, XXI, p. 410 (1925).

Plagusia bilineata, Klunzinger, *Verh. zool.-bot. Ges. Wien*, XXI, p. 573 (1871).

Paraplagusia dipterygia, Jordan & Starks, *Proc. U. S. Nat. Mus.*, XXXI, p. 236 (1906).

Plagusia marmorata var. *africana*, Gilchrist, *Mar. Invest. S. Afric.*, IV, p. 163 pl. xlvii (1908).

Depth of body $3\frac{4}{5}$ to 4 in the length, length of head 4 to $4\frac{1}{3}$. Snout rounded or obtusely pointed, equal to or a little longer than head behind lower eye; rostral hook rather long, its posterior edge $2\frac{1}{4}$ to $2\frac{3}{4}$ in length of head, ending behind lower eye; interorbital width equal to or less than diameter of eye, which is 9 to 11 in length of head; upper eye in advance of lower; angle of mouth below or a little behind posterior part of lower eye, much nearer gill-opening than end of snout. Fringes on lower lip generally strongly arborescent. Dorsal 106-118. Anal 86-93. Scales



TEXT-FIG. 9.—Outline drawing of *Paraplagusia bilineata* (Bloch). $\frac{3}{4}$ Nat. size.

ctenoid, those of ocular side more strongly denticulated than those of blind side; 98 to 114 in a longitudinal series; two lateral lines on ocular

side, separated by 16 to 19 series of scales ; no distinct lateral line on blind side. Brownish, spotted and marbled with darker.

Described from several specimens, 80 to 190 mm. in total length.

Hab.—From East Africa, through the Indian Ocean and Archipelago to China and Japan.

F. 3432/1 (8 spec.)	..	Puri, Orissa Coast.	..	Jenkins.
F. 4177/1, F. 2687/1 (pt.)	..	Puri, Orissa Coast.	..	Annandale.
F. 2104/1	..	Puri, Orissa.	..	Paiva.
12676-7, 12679	..	Stn. 67 : 19 miles S. W. of Gopalpur, 9 to 10 fms.	..	"Investigator."
15561-2	..	Gangaram, Gangetic Delta.	..	
— (2 spec.)	..	Sundarbans, mouth of R. Hughli.	..	Kemp.
7999	..	Akyab, Burma.	..	Dodgson.
10600	..	Akyab Bazaar, Burma.	..	Yunnan Exped. (Anderson).
459 (Cat.)	..	..	??

Specimens in the British Museum from Malabar ; Ceylon ; Ganjam ; Batjan.

This species is very close to *P. unicolor*, Macleay, from Australia, but differs in having a larger head, rather longer rostral hook, a greater number of anal rays and smaller scales.

Klunzinger, who has examined the type of *Pleuronectes bilineatus*, states that it is identical with the species described by Bleeker and Günther as *P. marmoratus*.

2. *Paraplagusia blochii* (Bleeker).

Plagusia bilineata (non Bloch), Cantor, *J. Asiat. Soc. Bengal*, XVIII, pt. 2, p. 1209 (1850) ; Jerdon, *Madras J. Lit. Sci.*, XVII, No. 39, p. 148 (1851), 1853 ; Günther, *Cat. Fish.*, IV, p. 492 (1862) ; Day, *Fish. Malabar*, p. 174 (1865) ; *Fish. India*, p. 431 (1877) ; Alcock, *J. Asiat. Soc. Bengal*, LVIII, pt. 2, p. 290 (1889) ; Jenkins, *Mem. Ind. Mus.*, III, p. 29 (1910).

Plagusia blochii, Bleeker, *Nat. Tijdschr. Ned. Ind.*, I, p. 411 (1851) ; *Verh. Bat. Gen.*, XXIV, Pleuron, p. 21 (1852) ; von Martens, *Exp. nach Ost. Asien*, I, p. 398 (1876).

Paraplagusia bilineata, Bleeker, *Atl. Ichth.*, VI, p. 47, Pleuron, pl. xiii, fig. 5 (1866).

Plagusia obscura, Jenkins, *Rec. Ind. Mus.*, V, p. 134 (1910).

"*Jerree Potoo*" E, Russell, *Descr. Fish. Vizag.*, I, p. 58, pl. lxxiv (1803).

Depth of body $3\frac{3}{5}$ to $3\frac{3}{4}$ in the length, length of head $3\frac{2}{3}$ to $4\frac{1}{8}$. Snout obtusely pointed, about equal to head behind lower eye ; rostral hook of moderate length, its posterior edge 3 to $3\frac{1}{2}$ in length of head, ending below middle or posterior part of lower eye ; interorbital width equal to or greater than diameter of eye in adults, which is 10 to 12 in length of head ; upper eye in advance of lower ; angle of mouth below posterior part of lower eye, nearer gill-opening than end of snout. Fringes on lower lip generally strongly arborescent. Dorsal 99-104. Anal 76-82. Scales ctenoid, those of ocular side rather more strongly denticulated than those of blind side ; 75 to 83 in a longitudinal series ; two lateral lines on ocular side, separated by 13 to 16 series of scales ; no distinct lateral line on blind side. More or less uniformly brownish.

Described from 13 specimens, 110 to 240 mm. in total length, including the type of *P. obscura*.

Hab.—East Africa, through the Indian Ocean and Archipelago to Formosa.

F. 1845/1 (Type of *P. obscura*) Karachi.

2359	..	Madras.	
12389		Godaveri Coast, 4 to 5 fms.	.. "Investigator."
F. 3431/1	..	Ganjam Coast, 24 to 30 fms.	.. "Golden Crown."
F. 3446/1, F. 2687/1(pt.)	..	Puri, Orissa Coast.	.. Annandale.
F. 3447/1	..	" "	.. Jenkins.
F. 1680-1/1, 1698/1	..	" "	.. Annandale & Lloyd.
F. 2100-3/1	..	" "	Paiva.
—	..	Sundarbans, mouth of R. Hughli.	Settlement Officer, Khulna.
—	..	Sandheads, mouth of R. Hughli.	P. V. "Lady Fraser."
11591	..	Sandheads, R. Hughli.	.. Daly.
11558-60	..	Gangaram, Vizagapatam.	
138, —.	..	Rangabali, nr. Raymangal, Khulna, Sundarbans.	Rahim.
—	..	??	
— ??	

A specimen in the British Museum from Orissa.

2. *Cynoglossus* (Ham. Buch.)

Cynoglossus, Hamilton (Buchanan), *Fish. Ganges*, p. 32 (1822).

Numerous species from west Africa and the Indo-Pacific; twenty-one known from India.

Synopsis of the Indian Species.

- A. Three lateral lines on ocular side.
 - B. No distinct lateral line on blind side.
 - C. Depth $3\frac{1}{2}$ to $4\frac{1}{4}$ in length, head $4\frac{2}{3}$ to $5\frac{1}{2}$; maxillary extending to below middle or hinder part of eye; 10 to 12 scales between upper and middle lateral lines.
 - D. A single nostril on ocular side; snout 3 in head 1. *sealarki*.
 - DD. Two nostrils on ocular side; snout $3\frac{2}{3}$ in head 2. *versicolor*.
 - CC. Depth $3\frac{1}{2}$ to $3\frac{3}{4}$ in length, head about $3\frac{1}{2}$; maxillary extending to well beyond eye; 15 to 17 scales between upper and middle lateral lines 3. *carpenteri*.
 - BB. Two lateral lines on blind side 4. *quinquelineatus*.
 - AA. Two lateral lines on ocular side.
 - B. Two lateral lines on blind side.
 - C. Head $4\frac{2}{3}$ to 5 in length; snout $2\frac{1}{2}$ to $2\frac{4}{5}$ in head; angle of mouth equidistant from end of snout and gill-opening or nearer the latter; 15 to 18 scales between lateral lines on blind side 5. *bilineatus*.
 - CC. Head about $5\frac{1}{2}$ in length; snout $3\frac{1}{2}$ to $3\frac{2}{3}$ in head; angle of mouth nearer end of snout than gill-opening; 22 to 25 scales between lateral lines on blind side 6. *dispar*.
 - BB. Never more than one lateral line on blind side.
 - C. Scales cycloid on ocular side; a distinct lateral line on blind side 7. *dubius*.
 - CC. Scales ctenoid on ocular side; no distinct lateral line on blind side.

- D.** Scales cycloid on blind side ; 7 to 14 between lateral lines.
- E.** 12 to 14 scales between lateral lines ; depth $5\frac{3}{8}$ to $6\frac{1}{2}$ in length .. 8. *lingua*.
- EE.** 7 to 10 scales between lateral lines.
- F.** Depth $4\frac{7}{8}$ to $5\frac{1}{4}$ in length ; snout $2\frac{1}{2}$ to $2\frac{1}{4}$ in head ; eye 15 to 17 in head .. 9. *arcl*.
- FF.** Depth $3\frac{1}{8}$ to $4\frac{3}{8}$ in length ; snout $2\frac{2}{5}$ to $2\frac{3}{5}$ in head ; eye $8\frac{1}{4}$ to 12 in head .. 10 *macrolepidotus*.
- DD.** Scales ctenoid on blind side.
- E.** 16 to 21 scales between lateral lines.
- F.** Eyes very small, prominent, subcontiguous, diameter 15 to 16 in head ; both nostrils close together in front of eyes ; 116 to 126 scales in a longitudinal series .. 11. *monopus*.
- FF.** Eyes moderate or small, not prominent, more or less separated from each other ; diameter 8 to 14 in head ; anterior nostril in front of lower eye, posterior in interorbital space or between anterior part of eyes ; 80 to 110 scales in a longitudinal series.
- G.** Maxillary extending to well beyond eye ; head $3\frac{3}{8}$ to $3\frac{5}{8}$ in length ; snout $3\frac{3}{8}$ to $3\frac{5}{8}$ in head ; eye 13 to 14 in head ; about 95 scales in a longitudinal series .. 12. *macrostomus*.
- GG.** Maxillary extending to below posterior part of eye or a little beyond ; head $4\frac{1}{2}$ to $5\frac{1}{2}$ in length ; snout $2\frac{7}{8}$ to $3\frac{1}{2}$ in head ; eye 8 to 10 in head ; 91 to 110 scales in a longitudinal series .. 13. *puncticeps*.
- GGG.** Maxillary extending to below posterior part of eye ; head 5 to $5\frac{3}{8}$ in length ; snout 3 to $3\frac{3}{8}$ in head ; eye 8 to 10 in head ; 80 to 98 scales in a longitudinal series .. 14. *brevis*.
- EE.** 12 to 15 scales between lateral lines.
- F.** Angle of mouth nearer to end of snout than gill-opening or midway between them ; snout $2\frac{3}{8}$ to $3\frac{1}{2}$ in head ; rostral hook not extending to below eye.
- G.** Snout rounded or obtusely pointed, about $3\frac{1}{2}$ in head ; depth $3\frac{3}{8}$ to 4, head $4\frac{1}{2}$ to 5 in length ; body with irregular and incomplete cross-bands .. 15. *semifasciatus*.
- GG.** Snout pointed, $2\frac{3}{8}$ to $2\frac{3}{4}$ in head ; depth $3\frac{1}{2}$ to $3\frac{3}{4}$, head $4\frac{3}{8}$ to nearly 5 in length ; body uniform or vaguely marbled with darker markings .. 16. *cynoglossus*.

- GGG.** Snout pointed, $2\frac{2}{3}$ to $2\frac{3}{4}$ in head; depth $4\frac{1}{4}$ to $4\frac{3}{4}$, head $4\frac{1}{2}$ to $4\frac{3}{5}$ in length; body with traces of darker markings .. 17. *sumatranus*.
- FF.** Angle of mouth nearer to gill-opening than end of snout; rostral hook extending to below lower eye; snout $2\frac{1}{3}$ to $2\frac{1}{2}$ in head 18. *lida*.
- EEE.** 9 to 11 scales between lateral lines.
- F.** Depth $3\frac{1}{2}$ to 4, head $4\frac{2}{3}$ to $5\frac{1}{4}$ in length; snout $3\frac{1}{4}$ to $3\frac{1}{2}$, eye 6 to $7\frac{1}{2}$ in head; dorsal with 102 to 112 rays; anal with 84 to 88 rays .. 19. *brachycephalus*.
- FF.** Depth $3\frac{3}{4}$ to 4, head about 4 in length; snout $2\frac{2}{3}$ to $2\frac{3}{4}$, eye 15 to 18 in head; dorsal with about 95 rays; anal with about 70 rays .. 20. *deltæ*.
- FFF.** Depth $4\frac{1}{4}$, head $5\frac{1}{4}$ in length; snout $3\frac{3}{5}$, eye about 11 in head; dorsal with about 91 rays; anal with about 76 rays 21. *brevirostris*.

This genus has been further sub-divided into several genera, based on the form of the nostrils and the number of lateral lines. Pending a complete revision of the whole family, I have retained the genus *Cynoglossus* in the unrestricted sense of Günther and Bleeker.

1. *Cynoglossus sealarki* Regan.

Cynoglossus sealarki, Regan, *Trans. Linn. Soc., Zool.*, XII, p. 235, pl. 26 fig. 1 (1908).

Depth of body 4 to $4\frac{1}{4}$ in the length, length of head $4\frac{2}{3}$ to 5. Snout rounded, length 3 in head; rostral hook short, extending to below mandibular symphysis; diameter of eye 7 to 8 in length of head and 2 to 3 times the interorbital width; upper eye a little in advance of lower; maxillary extending to below middle of eye, posterior edge nearer end of snout than gill-opening. A single tubular nostril on ocular side in front of lower eye. Dorsal 108-116. Anal 90-95. Scales ctenoid on ocular side, cycloid on blind side; 65 to 70 in a longitudinal series¹; three lateral lines on ocular side, the upper and middle separated by 10 to 12 series of scales; no distinct lateral line on blind side. Uniformly brownish.

Described from 4 specimens, 172 to 190 mm. in total length; types of the species (B. M. Reg. No. 1908. 3. 23. 153-6).

Hab.—Saya de Malha Bank, over 123 fms.

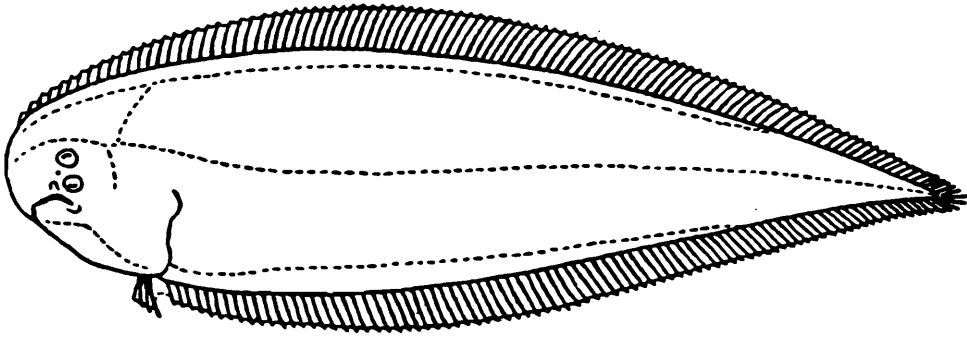
2. *Cynoglossus versicolor* Alcock.

Cynoglossus versicolor, Alcock, *Ann. Mag. Nat. Hist.* (6) VI, p. 442 (1890); *J. Asiat. Soc. Bengal*, LXV, pt. 2, p. 330 (1896).

Depth of body $3\frac{4}{5}$ in the length, length of head $5\frac{1}{5}$. Snout rounded, length $3\frac{2}{3}$ in head; rostral hook short, scarcely extending beyond mandibular symphysis; diameter of eye $6\frac{3}{5}$ in length of head and about

¹ Counted from above gill-opening to base of caudal.

twice the interorbital width ; upper eye a little in advance of lower ; maxillary extending to below hinder part of eye, posterior edge nearer



TEXT-FIG. 10.—Outline drawing of *Cynoglossus versicolor* Alcock. $\frac{3}{4}$ Nat. size.

end of snout than gill-opening. Two nostrils on ocular side, a simple one between the anterior parts of the eyes and a tubular one in front of lower eye. Dorsal 114. Anal 89. Scales ctenoid on both sides of body ; about 74 in a longitudinal series ; three lateral lines on ocular side, the upper and lower incomplete posteriorly ; 12 series of scales between the upper and middle lateral lines ; no distinct lateral line on blind side. Uniformly brownish.

Described from a single specimen, 120 mm. in total length ; type of the species.

Hab.—Orissa Coast.

12895 (type) ..

.. Orissa Coast, 11 fms.

Townsend.

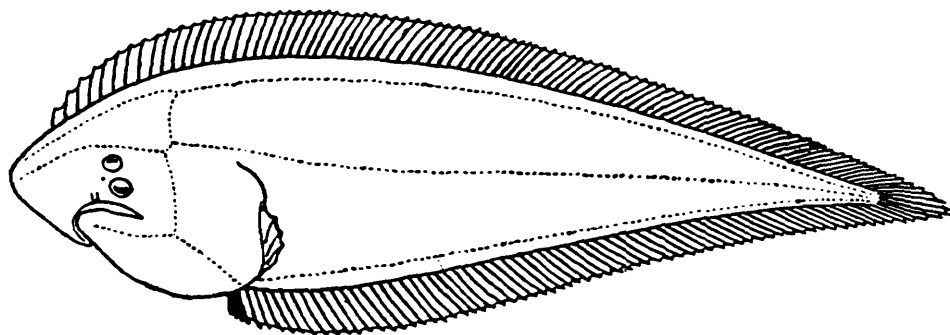
Close to *C. kopsii*, Bleeker, differing in the smaller scales and in the greater number of dorsal and anal rays. In his description of this species, Alcock states that there is only one nostril on the coloured side, and two lateral lines. Re-examination of the type shows a distinct, although incomplete lower lateral line, and an opening which appears to be the posterior nostril between the anterior parts of the eyes.

3. *Cynoglossus carpenteri* Alcock.

Cynoglossus carpenteri, Alcock, *J. Asiat. Soc. Bengal*, LVIII, pt. 2, p. 287, pl. xviii, fig. 1 (1889) ; *Ann. Mag. Nat. Hist.* (6) VI, p. 217 (1890) ; *J. Asiat. Soc. Bengal*, LXV, pt. 2, p. 330 (1896) ; *Illust. Zool. "Investigator,"* Fishes, pl. xxii, fig. 5 (1898) ; *Cat. Indian Deep-Sea Fishes*, p. 133 (1899) ; Boulenger, *Ann. Mag. Nat. Hist.* (7) VII, p. 263 (1901) ; Regan, *J. Bombay Nat. Hist. Soc.*, XVI, p. 329 (1905).

Depth of body $3\frac{1}{2}$ to $3\frac{4}{5}$ in the length, length of head about $3\frac{1}{2}$. Snout obtusely pointed, length about 3 in head ; rostral hook short, not extending to below eye ; diameter of eye 9 to 12 in length of head, and 2 or 3 times the interorbital width ; upper eye a little smaller and in advance of the lower ; maxillary extending to well beyond eye, posterior edge equidistant from end of snout and gill-opening or a little nearer the latter. Two nostrils on ocular side, a simple one between the anterior parts of the eyes, a tubular one in front of lower eye. Dorsal 93-108. Anal 80-88. Scales cycloid on ocular side, except on posterior part of body where they are armed with a few strong spinules ; those on blind side all cycloid ; 83 to 91 scales in a longitudinal series ; three lateral lines on ocular side, the upper and middle separated by 15 to 17 series

of scales ; no distinct lateral line on blind side. Brownish ; opercular region blackish ; caudal and often the greater part of the dorsal and anal fins blackish.



TEXT-FIG. 11.—Outline drawing of *Cynoglossus carpenteri* Alcock. $\frac{1}{2}$ Nat. size.

Described from numerous specimens, up to 200 mm. in total length.

Hab.—Persian Gulf ; Gulf of Oman ; Arabian Sea ; Bay of Bengal ; in deep water.

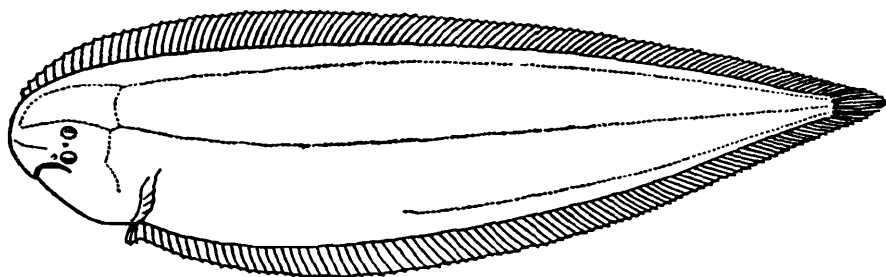
F. 1160-2/1 ..	..	Stn. 341 ; Gulf of Oman, 230 fms.	"Investigator,"
F. 1275-80/1 ..	..	,, 356 ; Arabian Sea, 156 to 200 fms.	,,
F. 647-59/1 ..	..	Off Calicut, 100 fms...	..
12726-8. (25 spec.)	..	Stn. 96 ; Bay of Bengal, 98 to 102 fms.	..
13589-94 ..	..	Stn. 170 ; Bay of Bengal, 107 fms.	..

Specimens in the British Museum from the Persian Gulf ; Gulf of Oman ; Arabian Sea ; Bay of Bengal.

4. *Cynoglossus quinquelineatus* Day.

Cynoglossus quinquelineatus, Day, *Fish. India*, p. 432, pl. xcvi, fig. 1 (1877).

Depth of body about 4 in the length, length of head $5\frac{1}{5}$. Snout rounded, length $2\frac{3}{4}$ in head ; rostral hook very short, scarcely extending to below mandibular symphysis ; diameter of eye $9\frac{1}{2}$ in length of head and about equal to interorbital width ; upper eye slightly in advance of lower ; maxillary extending to below posterior edge of eye, posterior edge nearer end of snout than gill-opening. Two nostrils on ocular side, a simple one between the eyes, a tubular one in front of lower eye. Dorsal 109. Anal 91. Scales ctenoid on ocular side, cycloid on blind side ;



TEXT-FIG. 12.—Outline drawing of *Cynoglossus quinquelineatus* Day. $\frac{1}{3}$ Nat. size.

about 95 in a longitudinal series ; three lateral lines on ocular side, the lower incomplete and extending from the middle of the body to the base

of the caudal ; upper and middle lateral lines separated by 17 series of scales ; two distinct lateral lines on the blind side. Brownish ; an irregular dark patch on the opercular region.

Described from a single specimen, 250 mm. in total length, believed to be the type of the species.

Hab.—Madras.

1265. (? type)

Madras.

This species is known only from this single specimen, which may prove to be an abnormal example of *C. bilineatus*, in which an incomplete lateral line has developed on the lower part of the body on the ocular side. It seems to differ from that species, however, in having a somewhat smaller eye, a shorter rostral hook, and in the position of the angle of the mouth.

5. *Cynoglossus bilineatus* (Lacep.).

Achirus bilineatus, Lacepède, *Hist. Nat. Poiss.*, IV, pp. 659, 663 (1802).

Plagusia quadrilineata, Bleeker, *Nat. Tijdschr. Ned. Ind.*, I, p. 412 (1850) ; *Verh. Bat. Gen.*, XXIV, Pleuron, p. 21 (1852).

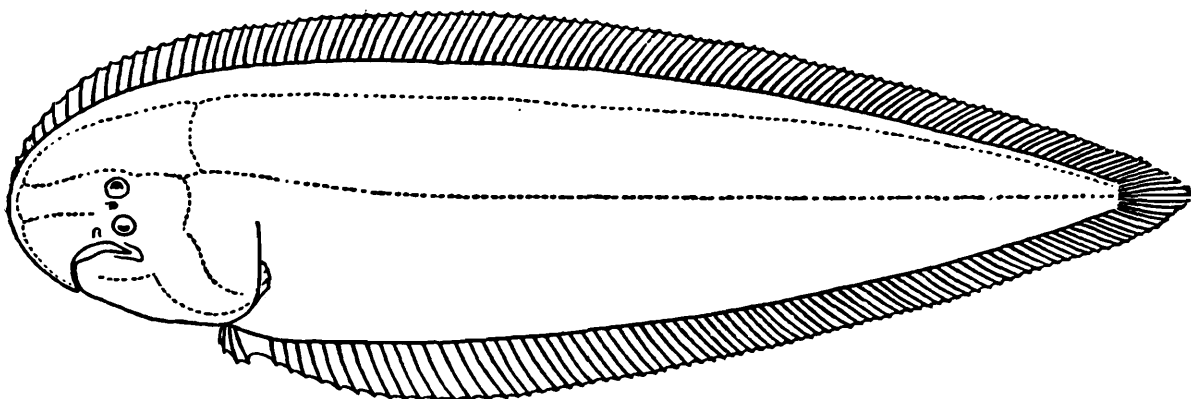
Arelia quadrilineata, Kaup, *Arch. Naturg.*, 1858, p. 107.

Cynoglossus quadrilineatus, Günther, *Cat. Fish.*, IV, p. 497 (1862) ; Bleeker, *Atl. Ichth.*, VI, p. 32, Pleuron. pl. xiv, fig. 3 (1866) ; Klunzinger, *Verh. zool.-bot. Ges. Wien*, XXI, p. 573 (1871) ; Day, *Fish. India*, p. 435 (1877) ; Klunzinger, *Sitzber. K. Ak. Wiss. Wien*, LXXX, Abt. 1, p. 409 (1880) ; Alcock, *J. Asiat. Soc. Bengal*, LVIII, pt. 2, p. 288 (1889) ; Steindachner, *Denkschr. Ak. Wiss. Wien*, LXXI, p. 154 (1902) ; Smith & Pope, *Proc. U. S. Nat. Mus.*, XXXI, p. 498 (1906) ; Jenkins, *Mem. Ind. Mus.*, III, p. 30 (1910).

Cynoglossus sindensis, Day, *Fish. India*, p. 434, pl. xc, fig. 6 (1877) ; Ogilby, *Proc. R. Soc. Queensland*, XXIII, p. 37 (1910).

Cynoglossus bilineatus, Weber, "*Siboga*"-*Exped.*, Monogr. 57, p. 443 (1913) ; Norman, *Biol. Res. "Endeavour"*, V, p. 301 (1926).

Depth of body $3\frac{3}{4}$ to $4\frac{1}{3}$ in the length, length of head $4\frac{2}{5}$ to 5. Snout rounded, length $2\frac{1}{2}$ to $2\frac{4}{5}$ in head ; rostral hook short, extending a little beyond mandibular symphysis ; diameter of eye $8\frac{1}{2}$ to 11 in length of head, a little greater than interorbital width ; upper eye in advance of lower, maxillary extending to below posterior edge of eye or beyond, posterior edge equidistant from end of snout and gill-opening or a little nearer the latter. Two nostrils on ocular side, a simple one between the eyes, a tubular one in front of lower eye. Dorsal 104-114. Anal



TEXT-FIG. 13.—Outline drawing of *Cynoglossus bilineatus* (Lacep.). $\frac{1}{2}$ Nat. size.

84-95. Scales ctenoid on ocular side, cycloid on blind side ; 84 to 96 in a longitudinal series ; two lateral lines on ocular side, separated by 14 to 19 series of scales ; two on blind side, separated by 15 to 18 series

of scales. Brownish ; generally an irregular dark patch on the opercular region.

Described from 25 specimens, 90 to 305 mm. in total length.

Hab.—From the Red Sea, through the Indian Ocean and Archipelago to Australia and Japan.

2715	..	..	Sind.	
1145-6	..	..	Madras.	
258	..	..	Near mouth of harbour, Madras.	Kemp.
12702	..	..	Ganjam Coast, 9 to 10 fms.	.. "Investigator."
F. 2627/1	..	..	Orissa Coast.	.. Annandale.
12318, 12324, 12263, 12319-23.		..	7 to 8 fms.	.. "Investigator."
F. 3444/1	..	..	Elephant Pt., Arakan Coast, Burma.	"Golden Crown."
—	??	

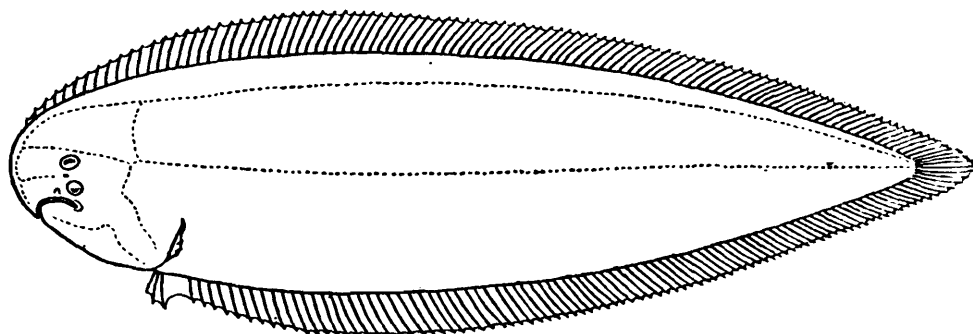
Specimens in the British Museum from Karachi ; Sind ; Seychelles.

The types of *C. sindensis* appear to have been lost, but I have little doubt that it is this species.

6. *Cynoglossus dispar* Day.

Cynoglossus dispar, Day, *Fish. India*, p. 434, pl. xcvi, fig. 2 (1877).

Depth of body $3\frac{3}{5}$ to $3\frac{3}{4}$ in the length, length of head about $5\frac{1}{3}$. Snout rounded, length $3\frac{1}{5}$ to $3\frac{2}{5}$ in head ; rostral hook short, extending a little beyond mandibular symphysis ; diameter of eye $9\frac{1}{2}$ to $10\frac{1}{2}$ in length of head, somewhat greater than interorbital width ; upper eye a little in advance of lower ; maxillary extending to below posterior edge of eye or a little beyond, posterior edge nearer end of snout than gill-opening. Two nostrils on ocular side, a simple one between the eyes, a tubular one in front of lower eye. Dorsal 108-114. Anal 88-95. Scales ctenoid



TEXT-FIG. 14.—Outline drawing of *Cynoglossus dispar* Day. $\frac{1}{2}$ Nat. size.

on ocular side, cycloid on blind side ; 105 to 109 in a longitudinal series ; two lateral lines on ocular side, separated by 18 or 19 series of scales ; two on blind side, separated by 22 to 25 series of scales ; upper lateral line on blind side ending in posterior $\frac{1}{4}$ of body. Brownish, more or less irregularly blotched with darker ; fins blackish, or with numerous black spots.

Described from 4 specimens, 95 to 350 mm. in total length, including examples believed to be the types of the species.

Hab.—Bombay ; Madras.

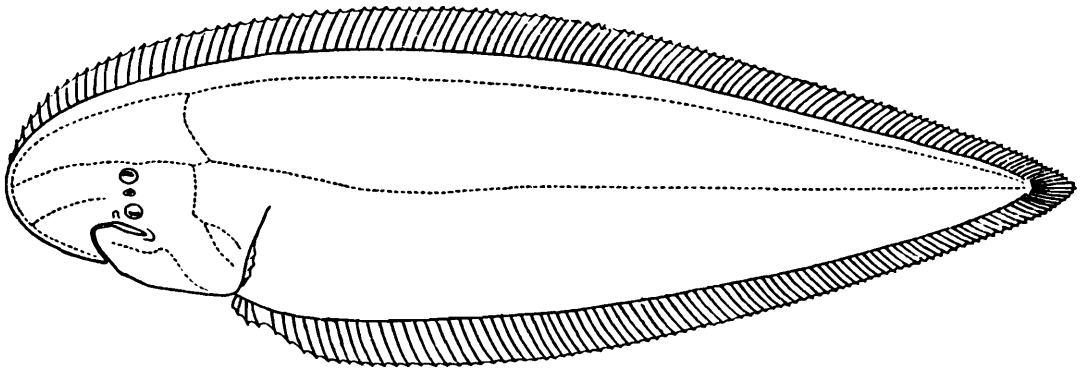
1141, 1144 (? types) .. Bombay.

Specimens in the British Museum from Madras.

7. *Cynoglossus dubius* Day.

Cynoglossus dubius, Day, *J. Linn. Soc., Zool.*, XI, p. 525 (1873); *Fish. India*, p. 435, pl. xcv, fig. 2 (1877).

Depth of body $3\frac{4}{5}$ to $4\frac{1}{6}$ in the length, length of head about 4. Snout rounded or obtusely pointed, length $2\frac{1}{3}$ in head; rostral hook short, extending a little beyond mandibular symphysis; diameter of eye 13 to 16 in length of head, $1\frac{1}{5}$ to $1\frac{1}{2}$ in interorbital width; upper eye in advance of lower; maxillary extending to beyond eye, posterior edge nearer to gill-opening than end of snout. Two nostrils on ocular side, a simple



TEXT-FIG. 15.—Outline drawing of *Cynoglossus dubius* Day. $\frac{1}{2}$ Nat. size.

one between the eyes, a tubular one in front of lower eye. Dorsal 108-112. Anal 85-89. Scales cycloid on both sides; about 95 in a longitudinal series; two lateral lines on ocular side, separated by 19 to 21 series of scales; a distinct lateral line in the middle of the blind side.¹ Uniformly brownish.

Described from 4 specimens, 220 to 460 mm. in total length, including an example believed to be the type of the species.

Hab.—Sind and Baluchistan; Travancore.

F. 1812/1	..	..	Karachi.	..	..	Cumming.
1142 (? type)	..	..	Bombay.			

Specimens in the British Museum from Karachi and Travancore.

8. *Cynoglossus lingua* Ham. Buch.

Cynoglossus lingua, Hamilton (Buchanan), *Fish. Ganges*, pp. 32, 365 (1822); Günther, *Cat. Fish.*, IV, p. 501 (1862); Day, *Fish. India*, p. 433, pl. xvi, fig. 1 (1877).

Pleuronectes potous, Cuvier, *Règne Anim.*, ed. 2, II, p. 344 (1829).

Plagusia lingua, Jerdon, *Madras. J. Lit. Sci.*, XVII, No. 39, p. 148 (1851) 1853.

Plagusia potous, Bleeker, *Verh. Bat. Gen.*, XXIV, Pleuron, p. 23 (1852); Jerdon, *l.c.* p. 148.

? *Arelia lingua*, Kaup, *Arch. Naturg.*, 1858, p. 107.

Arelia potous, Bleeker, *Act. Soc. Sci. Indo-Neerl.*, VI, Enum. Spec., p. 185 (1859).

Cynoglossus potous, Bleeker, *Atl. Ichth.*, VI, p. 33, Pleuron, pl. x, fig. 4 (1866).

Cynoglossus macrorhynchus, Kner, *Reise "Novara," Zool.*, I, 5, Fische, p. 295 (1869).

Cynoglossus elongatus, Day, *Fish. India*, p. 433, pl. xc, fig. 5 (1877).

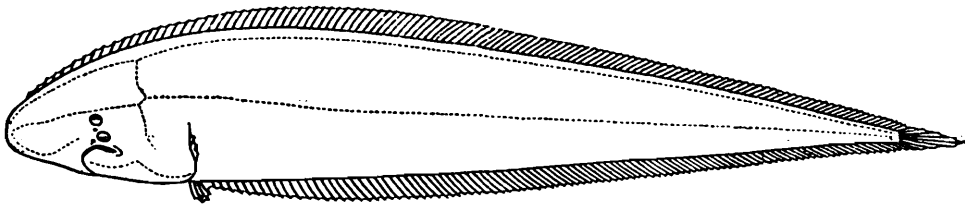
Cynoglossus acinaces, Jenkins, *Rec. Ind. Mus.*, V, p. 130 (1910).

"*Jerree Potoo*", D. Russell, *Descr. Fish. Vizag.*, I, p. 57, pl. lxxiii (1803).

Depth of body $5\frac{3}{5}$ to $6\frac{1}{2}$ in the length, length of head $4\frac{1}{2}$ to $4\frac{7}{8}$. Snout obtusely pointed, length $2\frac{1}{6}$ to $2\frac{1}{4}$ in head; rostral hook rather

¹ Day's statement that this species possesses two lateral lines on the blind side is probably incorrect. In all other characters the examples described above agree closely with his original description. I have little doubt that number 1142 is the specimen figured in the "*Fishes of India*."

short, extending a little beyond mandibular symphysis ; diameter of eye 11 to 14 in length of head, equal to or greater than interorbital width; upper eye in advance of lower ; maxillary extending to beyond eye; posterior edge much nearer gill-opening than end of snout. Two nostrils on ocular side, a simple one between the eyes, a tubular one in front of lower eye. Dorsal 130-175. Anal 101-124. Scales ctenoid on ocular side,¹ cycloid on blind side ; 93 to 104 in a longitudinal series ; two



TEXT-FIG. 16.—Outline drawing of *Cynoglossus lingua*, Ham. Buch. $\frac{1}{3}$ Nat. size.

lateral lines on ocular side, separated by 12 or 13 (occasionally 14) series of scales ; no distinct lateral line on blind side. Brownish or greyish, with or without indistinct darker patches ; opercular region generally blackish, fins darker posteriorly.

Described from numerous specimens, up to 420 mm. in total length, including a dried skin, said to be the type of the species, and the types of *C. acinaces*.

Hab.—Coasts of India to the Malay Peninsula and Archipelago.

2716	..	..	Madras.	
1208, 1461	..	..	Calcutta.	
F. 3940/1	..	..	Kan Kondigee, 24 Perg., Bengal.	"Golden Crown."
160	..	..	Sallermukai R., 24 Perg., Bengal.	Jenkins.
F. 5849/1	..	..	Kushtia, E. Bengal	"
137	..	..	Rangabali, nr. Raymangal, Khulna, Sundarbans.	Rahim.
4149 (5 spec.)	..	..	Morrelganj, Khulna, Sundarbans.	Bengal Fisheries.
(Types of <i>C. acinaces</i>).				
—	..	..	Sundarbans, mouth of R. Hughli.	Settlement Officer, Khulna.
— (8 spec.)	..	..	" " "	Kemp.
F. 5987/1	..	..	Nabaspur, Gangetic Delta.	Jenkins.
255	..	..	Morrison Bay, Mergui Archipelago.	"Investigator."
464-5 (Cat.) (8 spec.)	..	..	??

Specimens in the British Museum from Madras ; Orissa ; Calcutta ; N. E. Bengal ; Ganges ; Moulmein, Burma.

9. *Cynoglossus arel* (Bloch, Schneider).

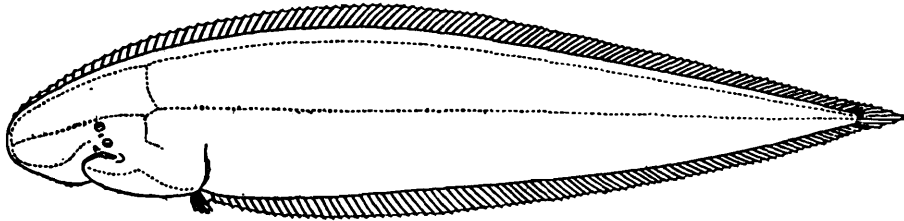
Pleuronectes arel, Bloch, Schneider, *Syst. Ichth.*, p. 159 (1801).

Plagusia lingua, Cantor, *J. Asiat. Soc. Bengal*, XVIII, pt. 2, p. 1215 (1850).

Cynoglossus elongatus, Günther, *Cat. Fish.*, IV, p. 501 (1862) ; Bleeker, *Atl. Ichth.*, VI, p. 34 (1866).

¹ The spinules are inclined to wear off in preserved specimens, so that the scales may appear to be cycloid.

Depth of body $4\frac{7}{8}$ to $5\frac{1}{4}$ in the length, length of head 4 to $4\frac{1}{3}$. Snout rounded or obtusely pointed, length $2\frac{1}{5}$ to $2\frac{1}{4}$ in head; rostral hook rather short, extending a little beyond mandibular symphysis; diameter of eye 15 to 17 in length of head, equal to or a little greater than interorbital width; upper eye a little in advance of lower; maxillary extending to beyond eye, much nearer gill-opening than end of snout. Two nostrils on ocular side, a simple one between the eyes, a tubular one in



TEXT-FIG. 17.—Outline drawing of *Cynoglossus arel* (Bloch, Schneider). $\frac{1}{3}$ Nat. size.

front of lower eye. Dorsal 122-138. Anal 90-109. Scales ctenoid on ocular side, cycloid on blind side; 60 to 65 in a longitudinal series; two lateral lines on ocular side, separated by 8 to 10 series of scales; no distinct lateral line on blind side. Brownish, with or without irregular blackish blotches.

Described from 5 specimens, 190 to 270 mm. in total length, including the type of the species,¹ and the type of *C. elongatus*.

Hab.—East coast of India; Penang.

13215	..	..	Orissa Coast, 7 fms.	..	"Investigator."
—	(2 spec.)		Sandheads, mouth of R. Hughli.		"Lady Fraser."

10. *Cynoglossus macrolepidotus* (Bleeker).

Plagusia macrolepidota, Bleeker, *Nat. Tijdschr. Ned. Ind.*, I, p. 415 (1850); *Verh. Bat. Gen.*, XXIV, Pleuron, p. 25 (1852).

Plagusia oligolepis, Bleeker, *Nat. Tijdschr. Ned. Ind.*, VII, p. 445 (1854).

Arelia macrolepidota, Bleeker, *Act. Soc. Sci. Indo-Neerl.*, VI, Enum. Spec. p. 184 (1859).

Arelia oligolepis, Bleeker, *t. c.*, p. 185.

Cynoglossus macrolepidotus, Günther, *Cat. Fish.*, IV, p. 496 (1862); Bleeker, *Atl. Ichth.*, VI, p. 34, Pleuron, pl. xi, fig. 2 (1866); Day, *Fish. India*, p. 434, pl. xevi, fig. 3 (1877); Alcock, *J. Asiat. Soc. Bengal*, LVIII, pt. 2, p. 288 (1889); Jenkins, *Mem. Ind. Mus.*, III, p. 30 (1910).

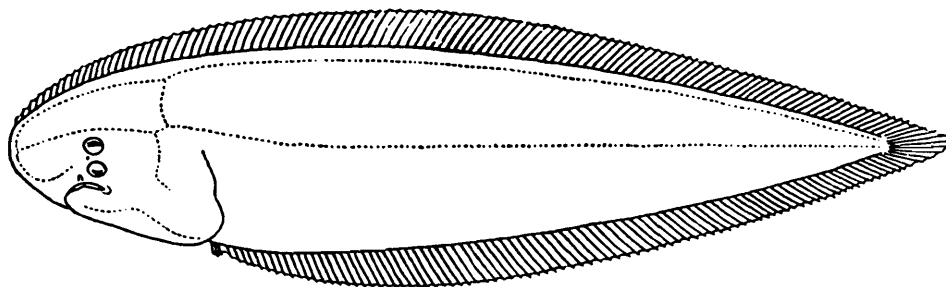
Cynoglossus oligolepis, Günther, *Cat. Fish.*, IV, p. 496 (1862); Bleeker, *Atl. Ichth.*, VI, p. 34, Pleuron, pl. xi, fig. 3 (1866); Day, *Fish. India*, p. 433, pl. xov, fig. 4 (1877); Alcock, *J. Asiat. Soc. Bengal*, LVIII, pt. 2, p. 280 (1889); Johnston, *Ceylon Pearl Oyster Fish*, Supp. Rep. XV, p. 209 (1904); Weber, "*Siboga*"-Exped., Monogr. 57, p. 441 (1913).

? *Cynoglossus arel*, Day, *Fish. India*, p. 434, pl. xcvi, fig. 2 (1877).

Depth of body $3\frac{4}{5}$ to $4\frac{2}{3}$ in the length, length of head 4 to $4\frac{2}{5}$. Snout rounded or obtusely pointed, length $2\frac{2}{5}$ to $2\frac{2}{3}$ in head; rostral hook short, extending a little beyond mandibular symphysis; diameter of eye $8\frac{1}{4}$ to 12 in length of head, equal to or greater than interorbital width; upper eye in advance of lower; maxillary extending to below posterior

¹ I am greatly indebted to Dr. P. Pappenheim, for his kindness in lending me the type-specimen of this species, which is preserved in the Zoologisches Museum, Berlin.

margin of eye or beyond, posterior edge equidistant from gill-opening and end of snout or nearer the former. Two nostrils on ocular side, a simple one between the eyes, a tubular one in front of lower eye. Dorsal 105-130. Anal 80-96. Scales ctenoid on ocular side, cycloid on blind side; 56 to 66 in a longitudinal series; two lateral lines on ocular side, separated by 7 to 9 series of scales; no distinct lateral line on blind



TEXT-FIG. 18.—Outline drawing of *Cynoglossus macrolepidotus* (Bleeker). $\frac{1}{4}$ Nat. size.

side. More or less uniformly brownish; fins sometimes darker posteriorly.

Described from numerous examples, 100 to 350 mm. in total length.

Hab.—Persian Gulf; Seas of India; Malay Peninsula and Archipelago; China.

156	..	..	Stn. 352; Persian Gulf, 13 fms.	..	"Investigator."
283-7		..	North end of Persian Gulf, 15 fms.		"
F. 4660-1		..	? Travancore.	..	Trivandrum Mus.
1143, 1190, 1458		..	Madras.		
12111-4, 12125-6			Orissa Coast, 10 fms.		"Investigator."
F. 2101/1	..	..	Puri, Orissa Coast.	..	Paiva.
F. 2626/1, 3433/1			" " "		Annandale.
F. 6177/1		..	Pratabnagore, Lower Bengal.	..	Mus. Coll. (Hodgart).
11497-500		..	Sandheads, mouth of R. Hughli.		Lash.
11528-30, 11613		..	" " "		Daly.
— (5 spec.)		..	" " "	..	"Lady Fraser."
F. 3648/1		..	Eastern Channel, mouth of R. Hughli.		"Golden Crown."
F. 3445/1, 8760/1			Bay of Bengal.	..	
F. 3572/1			? Bay of Bengal.	..	"
13631			Stn. 154; Bay of Bengal, 80 to 110 fms.		"Investigator."
10383-5		..	Andamans.	..	Dobson.
F. 1170-1/1	..	..	Stn. 329; Gulf of Martaban, 46 fms.		"Investigator."
279			Morrison Bay, Mergui Archipelago.		"
277		..	Stn. 548; 12° 49' 23" N., 98° 23' 30" E., 23 fms.		"
F. 2156/1	..	..	Stn. 378: off Akyab, Burma, 34 fms.		"

Specimens in the British Museum from Madras.

After examining a large number of specimens of all sizes, including examples of both species from Bleeker's collection, I am unable to separate *C. oligolepis* from *C. macrolepidotus*. The size of the eye seems to be very variable in this species.

11. *Cynoglossus monopus* (Bleeker).

Plagusia monopus, Bleeker, *Verh. Bat. Gen.*, XXII, Bijdr. Ichth. Bali, p. 11 (1848) 1849.

Plagusia melanopetrus, Bleeker, *Nat. Tijdschr. Ned. Ind.*, I, p. 415 (1850); *Verh. Bat. Gen.*, XXIV, Pleuron, p. 25 (1852).

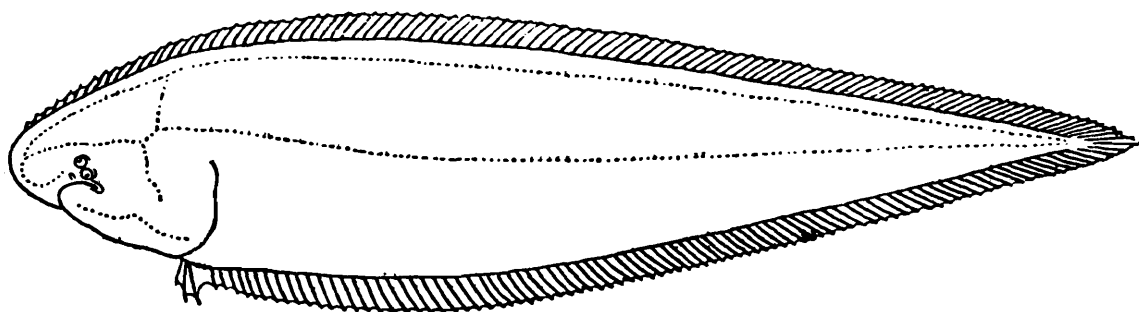
Arelia ceratophrys, Kaup, *Arch. Naturg.*, 1858, p. 108.

Arelia melanopterus, Bleeker, *Act. Soc. Sci. Indo-Neerl.*, VI, Enum. Spec. p. 184 (1859).

Cynoglossus melanopterus, Günther, *Cat. Fish.*, IV, p. 502 (1862); Alcock, *J. Asiat. Soc. Bengal*, LVIII, pt. 2, p. 289 (1889).

Cynoglossus monopus, Bleeker, *Atl. Ichth.*, VI, p. 38, Pleuron, pl. xiv, fig. 4 (1866) Alcock, *J. Asiat. Soc. Bengal*, LXV, pt. 2, p. 330 (1896).

Depth of body $4\frac{1}{5}$ to $4\frac{3}{5}$ in the length, length of head $4\frac{2}{3}$ to 5. Snout obtusely pointed, length about 3 in head; rostral hook short, extending a little beyond mandibular symphysis; eyes very small, prominent, subcontiguous, diameter 15 to 16 in length of head; upper eye in advance of lower; maxillary extending to beyond eye, posterior edge a little nearer end of snout than gill-opening. Two nostrils on ocular side, situated close together in front of eyes; anterior nostril tubular, posterior simple. Dorsal 110-119. Anal 85-98. Scales ctenoid on both sides;



TEXT-FIG. 19.—Outline drawing of *Cynoglossus monopus* (Bleeker). $\frac{2}{3}$ Nat. size.

116 to 126 in a longitudinal series; two lateral lines on ocular side, separated by 17 to 21 series of scales; no distinct lateral line on blind side. Pale brownish; fins darker.

Described from 11 specimens, 90 to 155 mm. in total length, including one from Bleeker's collection.

Hab.—Coasts of Ganjam and Orissa; Malay Archipelago; China

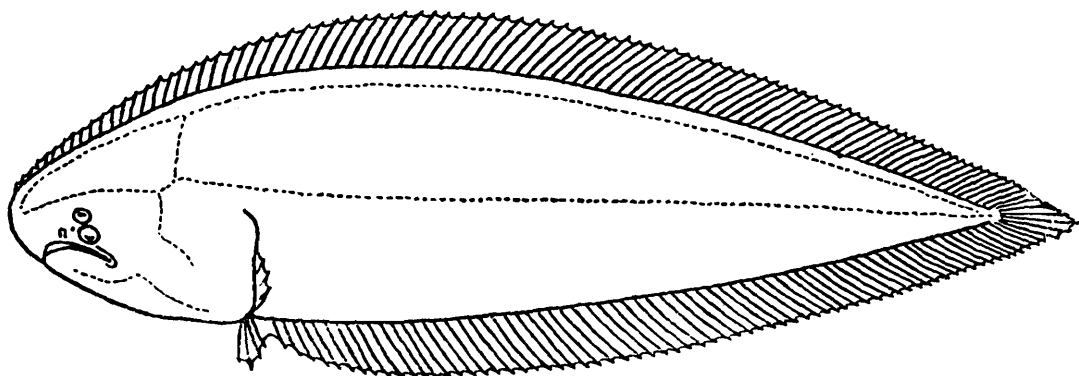
12420-5	..	..	Puri, Orissa Coast, 7 to 10 fms.	"Investigator."
12617	..	..	Ganjam Coast, 7 to 10 fms.	..

12. *Cynoglossus macrostomus*, sp. n.

Cynoglossus hamiltonii (non Günther), Day, *Fish. India*, p. 436, pl. xov, fig. 3 (1877).

Depth of body $3\frac{3}{4}$ to $3\frac{4}{5}$ in the length, length of head $3\frac{3}{5}$ to nearly 4. Snout obtusely pointed, length $3\frac{2}{3}$ to $3\frac{5}{6}$ in head; rostral hook very short, scarcely extending beyond mandibular symphysis; eyes close together, diameter 13 to 14 in length of head; upper eye slightly in advance of lower; maxillary extending to well beyond eye, posterior edge nearer snout than gill-opening. Two nostrils on ocular side, a simple one between the anterior parts of the eyes, a tubular one in front of lower eye. Dorsal 100-104. Anal 76-80. Scales ctenoid on both sides; about 95 in a longitudinal series; two lateral lines on ocular side,

separated by 16 series of scales ; no distinct lateral line on blind side. Brownish, with traces of darker blotches and cross-bars ; fins darker.



TEXT-FIG. 20.—Outline drawing of *Cynoglossus macrostomus*, sp. n. $\frac{3}{4}$ Nat. size.

Described from two specimens, 135 and 140 mm. in total length.

Hab.—Portuguese India (?) ; Orissa ; Calcutta.

1460 (Holotype) .. Calcutta.

?— .. Mormugao Bay, Portuguese India. Kemp.

A specimen in the British Museum from Orissa.

This species differs from *C. hamiltonii*, Günther, from Penang, in the larger head and in the greater number of scales between the lateral lines.

13. *Cynoglossus puncticeps* (Richardson).

Plagusia puncticeps, Richardson, *Rept. Brit. Assoc. Adv. Sci.*, (1845) 1846, p. 280.

Plagusia javanica, Bleeker, *Nat. Tijdschr. Ned. Ind.*, I, p. 414 (1851) ; *Verh. Bat. Gen.*, XXIV, Pleuron, p. 24 (1852).

Plagusia brachyrhynchus, Bleeker, *Nat. Tijdschr. Ned. Ind.*, I, p. 414 (1851) ; *Verh. Bat. Gen.*, XXIV, Pleuron, p. 24 (1852).

Arelia javanica, Bleeker, *Act. Soc. Sci. Indo-Neerl.*, VI, Enum. Spec. p. 184 (1859).

Arelia brachyrhynchus, Bleeker, *t. c.* p. 184.

Cynoglossus bengalensis (part), Günther, *Cat. Fish.*, IV, p. 499 (1862).

Cynoglossus brachyrhynchus, Günther, *Cat. Fish.*, IV, p. 499 (1862) ; Bleeker, *Atl. Ichth.*, VI, p. 37, Pleuron, pl. xii, fig. 4 (1866) ; Day, *Fish India*, p. 435, pl. xcvi, fig. 4 (1877) ; Johnstone, *Ceylon Pearl Oyster Fish.*, Supp. Rep., XV, p. 209 (1904) ; Weber, "*Siboga*"-Exped., Monogr. 57, p. 443 (1913).

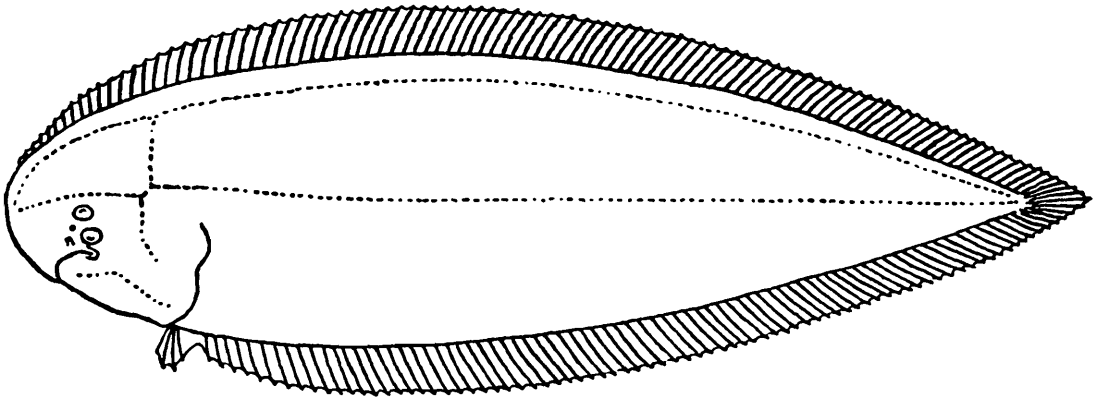
Cynoglossus puncticeps, Günther, *Cat. Fish.*, IV, p. 500 (1862) ; Bleeker, *Atl. Ichth.*, VI, p. 37, Pleuron, pl. xv, fig. 7 (1866) ; Day, *Fish. India*, p. 437 pl. xcvi, fig. 1 (1877) ; Alcock, *J. Asiat. Soc. Bengal*, LVIII, pt. 2, p. 289 (1889) ; Jenkins, *Mem. Ind. Mus.*, III, p. 30 (1910).

Cynoglossus lida, Jenkins, *Mem. Ind. Mus.*, III, p. 30 (1910).

Cynoglossus lida var. *punctatus*, Jenkins, *t. c.* p. 31.

Depth of body $3\frac{1}{3}$ to 4 in the length, length of head $4\frac{1}{2}$ to $5\frac{1}{5}$. Snout rounded or obtusely pointed, length $2\frac{7}{8}$ to $3\frac{1}{5}$ in head ; rostral hook rather short, extending beyond mandibular symphysis ; eyes close together, diameter 8 to 10 in length of head ; upper eye a little in advance of lower ; maxillary extending to below posterior part of eye or a little beyond, posterior edge a little nearer end of snout than gill-opening (sometimes midway between them). Two nostrils on ocular side, a simple one between the anterior parts of the eyes, a tubular one in front of lower eye. Dorsal 92-107 Anal 70-83. Scales ctenoid on both sides ; 91 to 110 in a longitudinal series ; two lateral lines on ocular side, separated by 16 to 21 series of scales ; no distinct lateral line on blind

side. Brownish ; large darker blotches on head and body, which are often united to form irregular cross-bands ; longitudinal series of scales



TEXT-FIG. 21.—Outline drawing of *Cynoglossus puncticeps* (Rich.). $\frac{2}{3}$ Nat. size.

frequently with fine dark stripes ; most of the markings disappearing with age ; some of the rays of the vertical fins marked with dark brown.

Described from numerous specimens, up to 165 mm. in total length.

Hab.—From Sind, through the Indian Ocean and Archipelago to China.

1148	..	..	Bombay.	
161, 282			Mormugao Bay, Portuguese India.	Kemp.
F. 4178/1, 4185-1, 4187-8/1			Trivandrum, Travancore.	.. Trivandrum Mus.
139	..	..	Stn. 467 ; off Travancore Coast,	" Investigator."
			42 to 75 fms.	
2693	..	..	Madras.	
180			Ennur Backwater, Madras.	.. Annandale.
1147	..	..	Calicut, Madras.	..
144-8	..		Near Ernakulam, Cochin Back-	Gravelly.
			water.	
12658-70, 12892		..	Ganajm Coast, 7 to 14 fms.	.. " Investigator ".
12107	..	..	Orissa Coast, 8 fms.	.. ..
1462	..	..	Moulmein, Burma.	

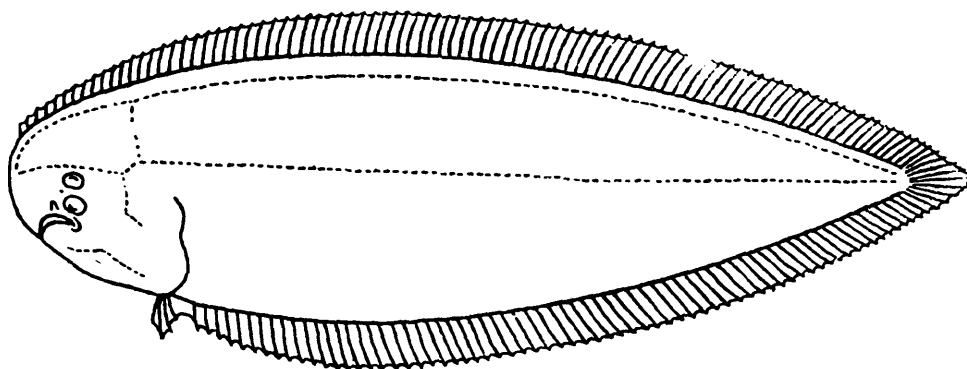
Specimens in the British Museum from Karachi ; Sind ; Bombay ; Andamans.

14. *Cynoglossus brevis* Günther.

Cynoglossus brevis, Günther, *Cat. Fish.*, IV, p. 500 (1862) ; Day, *Fish. India*, p. 437, pl. xcvi, fig. 2 (1877) ; Alcock, *J. Asiat. Soc. Bengal*, LVIII, pt. 2, p. 289 (1889) ; Hora, *Mem. Ind. Mus.*, V, p. 760 (1923).
Cynoglossus buehanani (part), Day, *Proc. Zool. Soc.*, 1869, p. 522.
Cynoglossus durbanensis, Regan, *Ann. Durban Mus.*, III, p. 2 (1921).

Very close to the preceding species, but depth of body $3\frac{1}{8}$ to $3\frac{2}{3}$ in the length, length of head 5 to $5\frac{3}{5}$. Snout rounded or obtusely pointed, length 3 to $3\frac{2}{3}$ in head. Dorsal 93-100. Anal 70-78. 80 to 98 scales in a longitudinal series, 16 to 21 between the lateral lines. Brownish, with darker spots and patches, which tend to form irregular transverse bands, which are more distinct in the young ; some of the rays of the vertical fins marked with dark brown or blackish.

Described from numerous examples, up to 160 mm. in total length, including the type of the species and the type of *C. durbanensis*.



TEXT-FIG. 22.—Outline drawing of *Cynoglossus brevis* Günther. $\frac{3}{4}$ Nat. size.

Hab.—East Coast of India.

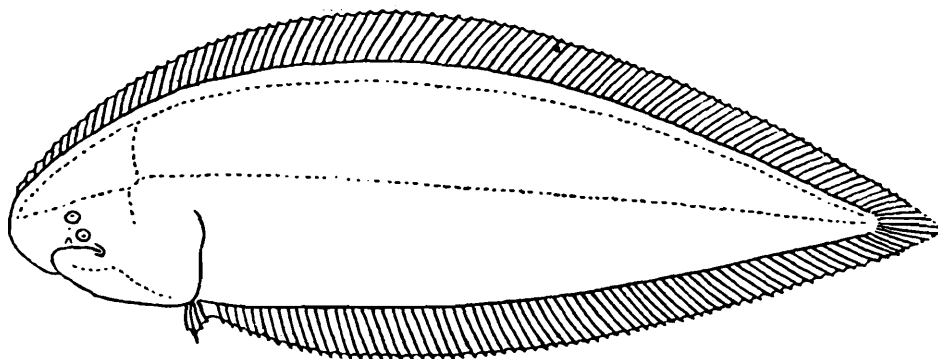
12671-4	Ganjam Coast, 7 to 14 fms.	..	"Investigator."
12235	Orissa Coast, 7 to 8 fms.	..	"
185-206, 210-216, 220-3, 225-249.	Chilka Lake. ¹		Chilka Survey.
1459, 2691 ..	Calcutta.		
F. 8579/1, 8581/1 ..	Calcutta Bazaar. ..	..	Asiat. Soc. Bengal.
463 (cat.) (? type of <i>C.</i> <i>buchanani</i>).	??		

Specimens in the British Museum from the Ganges (type), and Calcutta.

15. *Cynoglossus semifasciatus* Day.

Cynoglossus semifasciatus, Day, *Fish. India*, p. 436, pl. xcvi, fig. 5 (1877); Alcock, *J. Asiat. Soc. Bengal.* LVIII, pt. 2, p. 289 (1889); Jenkins, *Mem. Ind. Mus.*, III, p. 30 (1910).

Depth of body $3\frac{3}{5}$ to 4 in the length, length of head $4\frac{1}{2}$ to 5. Snout rounded or obtusely pointed, length about $3\frac{1}{2}$ in head; rostral hook rather short, extending a little beyond mandibular symphysis; diameter of eye 11 to 12 in length of head, greater than interorbital width; upper



TEXT-FIG. 23.—Outline drawing of *Cynoglossus semifasciatus* Day. $\frac{3}{4}$ Nat. size.

eye in advance of lower; maxillary extending to beyond eye, posterior edge nearer to snout than gill-opening. Two nostrils on ocular side, a

¹ The exact localities in the Chilka Lake have been listed by Hora;—*Mem. Ind. Mus.*, V, p. 760 (1923).

simple one between the anterior parts of the eyes, a tubular one in front of lower eye. Dorsal 97-105. Anal 74-81. Scales ctenoid on both sides; 75 to 84 in a longitudinal series; two lateral lines on ocular side, separated by 12 to 14 series of scales; no distinct lateral line on blind side. Brownish, with a number of irregular and incomplete darker cross-bands, extending on to the vertical fins.

Described from 6 specimens, 115 to 120 mm. in total length.

Hab.—East Coast of India.

12680-2	..	..	Ganjam Coast, 8 to 9 fms.	..	"Investigator".
F. 3437/1			Puri Coast, Orissa.		"Golden Crown".
12159	..		Orissa Coast, 7 to 10 fms.		"Investigator".
F. 6178/1			Pratabnagore, Lower Bengal.		Mus. Coll. (Hodgart).

16. *Cynoglossus cynoglossus* (Ham. Buch).

Achirus cynoglossus, Hamilton (Buchanan), *Fish. Ganges*, pp. 132, 373 (1822).

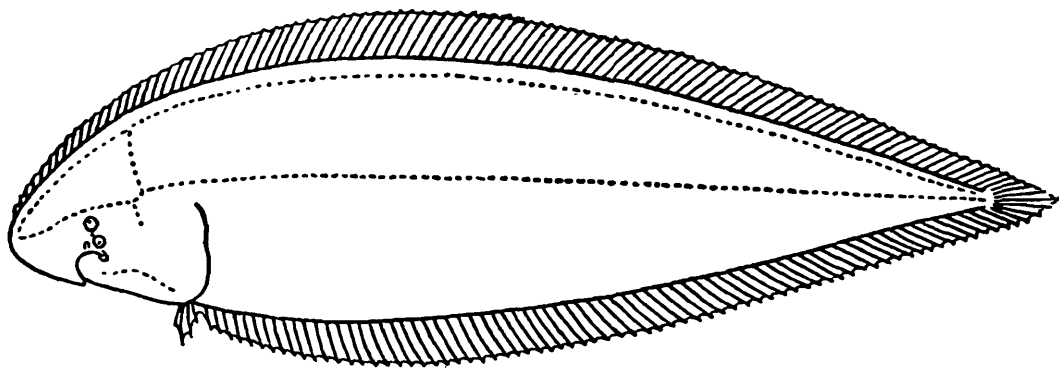
Plagusia bengalensis, Bleeker, *Verh. Bat. Gen.*, XXV, Bengal, p. 152, pl. vi, fig. 3 (1853).

Cynoglossus bengalensis (part), Günther, *Cat. Fish.*, IV, p. 499 (1862).

Cynoglossus buehanani (part), Day, *Proc. Zool. Soc.*, 1869, p. 522.

Cynoglossus bengalensis, Day, *Fish. India*, p. 435, pl. xcvi, fig. 4 (1877); Johnstone, *Ceylon Pearl Oyster Fish.*, Supp. Rep. XV, p. 209 (1904).

Depth of body $3\frac{1}{2}$ to $3\frac{3}{4}$ in the length, length of head $4\frac{2}{3}$ to nearly 5. Snout pointed, length $2\frac{3}{5}$ to $2\frac{2}{3}$ in head; rostral hook rather short, extending a little beyond mandibular symphysis; diameter of eye 10 to 12 in length of head, greater than interorbital width; upper eye a little in advance of lower; maxillary extending to below posterior edge of eye or a little beyond, posterior edge equidistant from end of snout and gill-opening or a little nearer the former. Two nostrils on ocular side, a simple one between the eyes, a tubular one in front of lower eye. Dorsal 98-106. Anal 78-83. Scales ctenoid on both sides; 80 to 89 in a longitudinal series; two lateral lines on ocular side, separated by 13 to 15



TEXT-FIG. 24.—Outline drawing of *Cynoglossus cynoglossus* (Ham. Buch.). $\frac{2}{3}$ Nat. size.

series of scales; no distinct lateral line on blind side. Brownish or greyish; sometimes vaguely marbled with darker.

Described from 15 specimens, up to 155 mm. in total length, including one believed to be the type of the species.

Hab.—Bengal.

1499, 2689	..	Calcutta.	
F. 8580/1, 8581/2		Calcutta Bazaar.	Asiat. Soc., Bengal.
461 (cat.)		Salt water lakes near Calcutta.	Anderson.
166	..	Passar R., Khulna, Bengal.	.. Southwell,

F. 6775/1 ..	Near Shela, Khulna district, Jenkins. Bengal.	
— (8 spec.)	Sundarbans.	.. Kemp.
178	Rangamati, Chittagong Hill Tracts, Kornafuli River.	Mus. Coll. (Hodgart).
9011 ..	Moisrakha.	.. Wood-Mason.
463 (cat.) (? type of <i>C. buchanaui</i>).	??	

Specimens in the British Museum from the Ganges, and from Calcutta.

Examination of Hamilton's figure, which is preserved among a collection of drawings in the British Museum, leaves little doubt that he depicted the same species as that described by Bleeker as *C. bengalensis*. This figure is labelled "Acheirus kukur jibha." There is a specimen of *C. bengalensis* in the British Museum collection (Reg. No. 58, 8, 15, 55), which was received from Mr. G. R. Waterhouse, and entered in the museum register as *Achirus gibba*. The Waterhouse collection was believed to contain many of Buchanan's types, and I think that the specimen in question was, in all probability, the type of his *Achirus cynoglossus*.

17. *Cynoglossus sumatranus* (Bleeker).

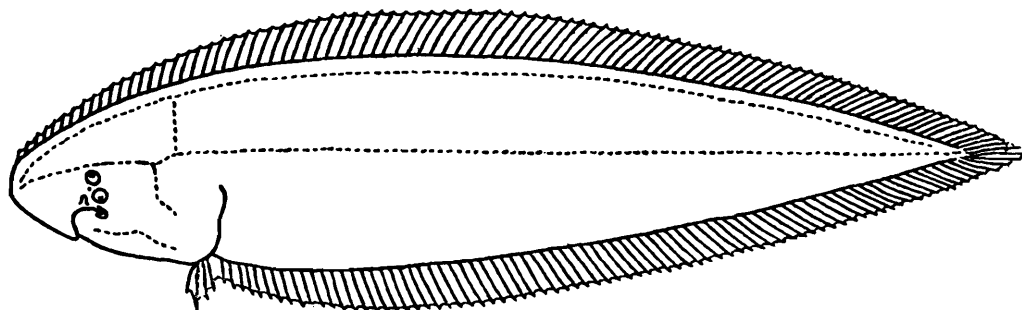
Plagusia sumatrana, Bleeker, *Nat. Tijdschr. Ned. Ind.*, V, p. 529 (1853).

Arelia sumatrensis, Bleeker, *Act. Soc. Sci. Indo-Neerl.*, VI, Enum. Spec. p. 185 (1859).

Cynoglossus sumatrensis, Günther, *Cat. Fish.*, IV, p. 497 (1862); Bleeker, *Atl. Ichth.*, VI, p. 35, Pleuron, pl. xii, fig. 1 (1866).

Cynoglossus bengalensis (part), Day, *Fish. India*, p. 436 (1877).

Depth of body $4\frac{1}{4}$ to $4\frac{2}{3}$ in the length, length of head $4\frac{1}{2}$ to $4\frac{3}{5}$. Snout pointed, length $2\frac{2}{3}$ to $2\frac{3}{4}$ in head; rostral hook short, extending a little beyond mandibular symphysis; diameter of eye $10\frac{1}{2}$ to 11 in length of head, greater than interorbital width; upper eye a little in advance of lower; maxillary extending to below posterior edge of eye, posterior edge a little nearer to snout than gill-opening. Two nostrils on ocular side, a simple one between the eyes, a tubular one in front of lower eye. Dorsal 101-105. Anal 73-80. Scales ctenoid on both sides; about 85 in a longitudinal series; two lateral lines on ocular side,



TEXT-FIG. 25.—Outline drawing of *Cynoglossus sumatranus* (Bleeker). $\frac{3}{4}$ Nat. size.

separated by 13 series of scales; no distinct lateral line on blind side. Pale brownish, with traces of darker markings.

Described from two specimens, 120 and 130 mm. in total length.

Hab.—Burma ; Mergui Archipelago ; Singapore ; Sumatra ; Philippines.

2688

Burma. ¹

152

Mergui.

Day.

I have identified these examples as *C. sumatranus* with a certain amount of doubt, as the specimen of that species in the British Museum collection, which was received from Dr. Bleeker, is in a very poor state of preservation.

18. *Cynoglossus lida* (Bleeker).

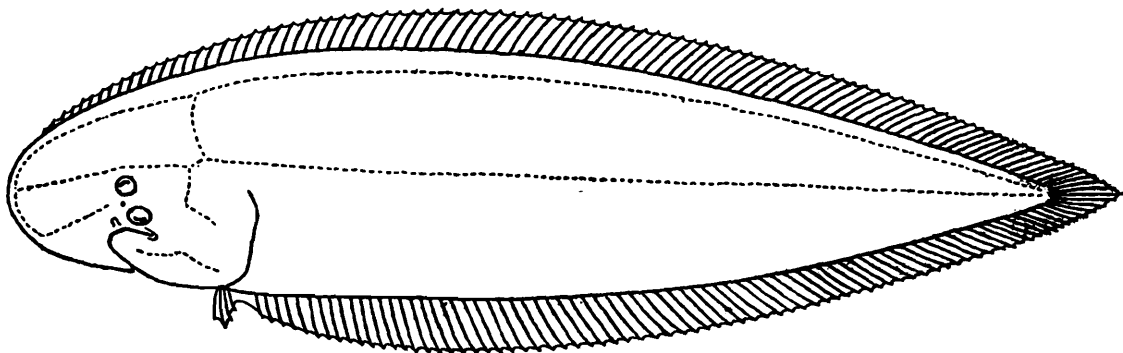
Plagusia lida, Bleeker, *Nat. Tijdschr. Ned. Ind.*, I, p. 413 (1851) ; *Verh. Bat. Gen. XXIV*, Pleuron, p. 23 (1852).

Arelia lida, Bleeker, *Act. Soc. Sci. Indo-Neerl.*, VI, Enum. Spec. p. 184 (1859).

Cynoglossus lida, Günther, *Cat. Fish.*, IV, p. 498 (1862) ; Bleeker, *Atl. Ichth.*, VI, p. 36, Pleuron, pl. xii, fig. 2 (1866) ; Day, *Fish. India*, p. 436, pl. xcvii, fig. 3 (1877) ; Alcock, *J. Asiat. Soc. Bengal*, LVIII, pt. 2, p. 288 (1889) ; Regan, *Ann. Durban Mus.*, II, p. 221 (1920) ; Barnard, *Ann. S. Afric. Mus.*, XXI, p. 411 (1925).

Cynoglossus intermedius Alcock, *J. Asiat. Soc. Bengal*, LVIII, pt. 2, p. 288 (1889).

Depth of body 4 to $4\frac{1}{2}$ in the length, length of head 4 to $4\frac{3}{5}$. Snout rounded, length $2\frac{1}{3}$ to $2\frac{1}{2}$ in head ; rostral hook of moderate length, extending to below lower eye ; diameter of eye 9 to $10\frac{1}{2}$ in length of head, much greater than interorbital width ; upper eye a little in advance of lower ; maxillary extending to below posterior edge of eye or beyond, posterior edge much nearer gill-opening than end of snout. Two nostrils on ocular side, a simple one between the anterior parts of the eyes, a tubular one in front of lower eye. Dorsal 99-112. Anal 75-87. Scales



TEXT-FIG. 26.—Outline drawing of *Cynoglossus lida* (Bleeker). $\frac{2}{3}$ Nat. size.

ctenoid on both sides ; 82 to 95 in a longitudinal series ; two lateral lines on ocular side, separated by 13 to 15 series of scales ; no distinct lateral line on blind side. Brownish or greyish ; sometimes a dark patch on the opercular region.

Described from 12 specimens, 100 to 189 mm. in total length, including the type of *C. intermedius*.

Hab.—East Africa ; Indian Ocean and Archipelago.

8905

Madras.

Day.

260-1

Near mouth of harbour, Madras.

Kemp.

12683-5

Stn. 67 : Ganjam Coast, 8 to 9 fms. "Investigator".

12259-62

Orissa Coast, 7 fms. "

12264 (type of *C. intermedius*).

,, "

F. 3434/1 (2 spec.)

Puri, Orissa Coast Paiva.

¹ This is probably the fish mentioned by Day (*Fish. India*, p. 436).

19. *Cynoglossus brachycephalus* Bleeker.

Cynoglossus brachycephalus, Bleeker, *Atl. Ichth.* VI, p. 38, Pleuron, pl. xiii, fig. 6 (1866); Regan, *Trans. Linn. Soc.*, Zool., XII, p. 235 (1908); Weber, "*Siboga*"-*Exped.*, Monogr. 57, p. 441 (1913).

Cynoglossus praecisus, Alcock, *Ann. Mag. Nat. Hist.*, (6) VI, p. 442 (1890).

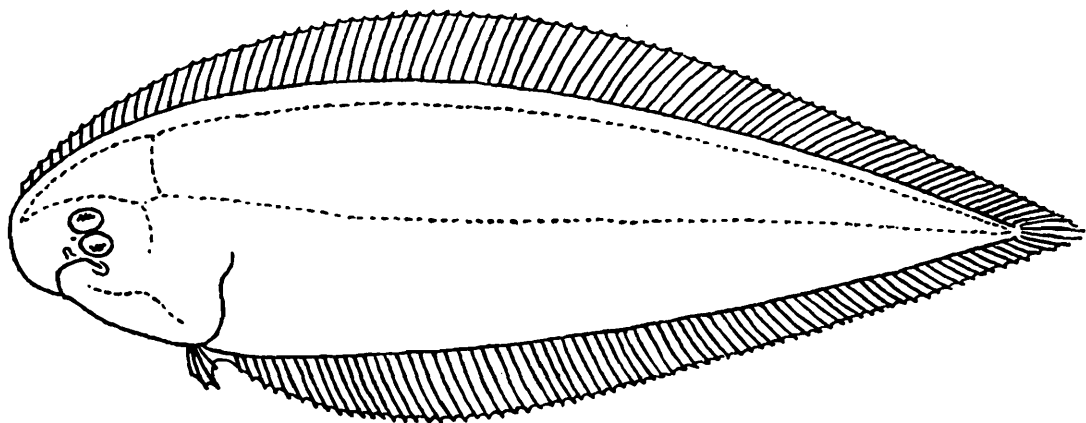
Cynoglossus brevirostris, Johnstone, *Ceylon Pearl Oyster, Fish.*, Supp. Rep. XV, p. 209 (1904).

Cynoglossus kopsii, Regan, *t. c.* p. 235.

? *Cynoglossus sibogae*, Weber, "*Siboga*"-*Exped.*, Monogr. 57, p. 442, fig. (1913).

Areliscus natalensis, Von Bonde, *Rep. Fish. Mar. Biol. Survey S. Afric.*, 2, Spec. Rep. I, p. 23, pl. iv, fig. 2 (1922).

Depth of body $3\frac{1}{2}$ to 4 in the length, length of head $4\frac{2}{3}$ to $5\frac{1}{4}$. Snout rounded or obtusely pointed, length $3\frac{1}{4}$ to $3\frac{1}{2}$ in head; rostral hook rather short, extending a little beyond mandibular symphysis; eyes narrowly separated or subcontiguous, diameter 6 to $7\frac{1}{2}$ in length of head; upper eye a little in advance of lower; maxillary extending to below posterior part of eye, posterior edge nearer to snout than gill-opening. Two nostrils on ocular side; a simple one between the anterior parts of the eyes, often hidden by scales and difficult to see without microscopic examination; a tubular one in front of lower eye. Dorsal 102-112. Anal 84-88. Scales ctenoid on both sides; 58 to 66 in a longitudinal series; two lateral lines on ocular side, separated by 9 or 10 series of scales; no distinct lateral line on blind side. Brownish; generally with some irregularly arranged darker spots and blotches.



TEXT-FIG. 27.—Outline drawing of *Cynoglossus brachycephalus* Bleeker. Nat. size.

Described from several specimens, 60 to 120 mm. in total length, including the types of *C. praecisus* and *C. natalensis*.

Hab.—From East Africa, through the Indian Ocean to the Malay Peninsula and Archipelago.

F. 999/1	..	..	Stn. 291 : Persian Gulf, 48 to 49 fms.	"Investigator".
177			Stn. 352 ; Persian Gulf, 13 fms.	"
14285			Mekran Coast, Arabian Sea.	Townsend.
12893. (type of <i>C. praecisus</i>)			Stn. 33 : Ganjam Coast, 33 fms.	"
12894			" " "	"
14021-34	..		Madras Coast, 20 fms.	"
281			Stn. 552 : 3 miles N. N. W. of Brown Rocks ($12^{\circ} 44' 00''$ N., $98^{\circ} 8' 30''$ E.), 25 fms.	"Investigator".

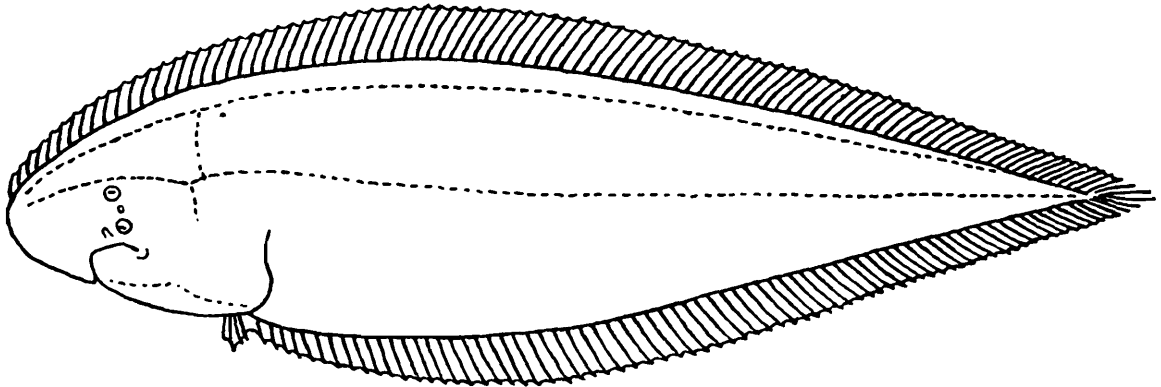
Specimens in the British Museum from Amirantes; Cargados Carajos; Seychelles; Maldives; and in the Herdman Collection from off the pearl banks, Aripu, Ceylon.

This species is very closely related to *C. kopsii*, Bleeker, with which it may prove to be identical. There is no trace, however, of a lower lateral line on the ocular side in any of the specimens described above.

20. *Cynoglossus deltae* Jenkins.

Cynoglossus deltae, Jenkins, *Rec. Ind. Mus.*, V. p. 130 (1910).

Depth of body $3\frac{2}{3}$ to 4 in the length, length of head about 4. Snout pointed, length $2\frac{2}{3}$ to $2\frac{2}{3}$ in head; rostral hook rather short, extending a little beyond mandibular symphysis; diameter of eye 15 to 18 in length of head, equal to or less than interorbital width; upper eye in advance of lower; maxillary extending a little beyond eye, posterior edge equidistant from end of snout and gill-opening. Two nostrils on ocular side, a simple one between the eyes, a tubular one in front of lower eye. Dorsal about 95. Anal about 70. Scales ctenoid on both sides; 65 to 75 in a longitudinal series; two lateral lines on ocular side, separated by



TEXT-FIG. 28.—Outline drawing of *Cynoglossus deltae* Jenkins. $\times 1\frac{3}{4}$.

10 or 11 (occasionally 12) series of scales; no distinct lateral line on blind side. Uniformly pale brownish.

Described from 12 specimens, 65 to 70 mm. in total length; types of the species.

Hab.—Sundarbans, Bengal.

4150. (12 spec., types of the species) Morrelganj, Khulna, Sundarbans. Bengal Fisheries.

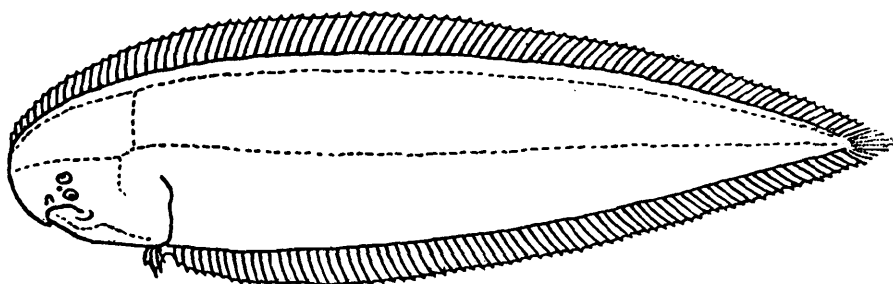
This species is perhaps identical with *C. cynoglossus*, but appears to differ in the larger head, smaller eye and larger scales.

21. *Cynoglossus brevirostris* Day.

Cynoglossus brevirostris, Day, *Fish. India*, p. 437, pl. xcvi, fig. 6 (1877).

Depth of body $4\frac{1}{4}$ in the length, length of head $5\frac{1}{4}$. Snout rounded, length $3\frac{3}{5}$ in head; rostral hook rather short, extending a little beyond mandibular symphysis; diameter of eye about 11 in length of head, much greater than interorbital width; upper eye a little in advance of lower; maxillary extending to a little beyond eye, posterior edge a little nearer to end of snout than gill-opening. Two nostrils on ocular side, a simple one between the anterior parts of the eyes, a tubular one in

front of lower eye. Dorsal 91. Anal 76. Scales ctenoid on both sides ; about 70 in a longitudinal series ; two lateral lines on ocular side, separated by 11 series of scales ; no distinct lateral line on blind side. Uniformly brownish.



TEXT-FIG 29.—Outline drawing of *Cynoglossus brevirostris* Day. $\frac{3}{4}$ Nat. size.

Described from a single specimen, 110 mm. in total length ; type of the species.

Hab.—Madras.

2690. (type) .. Madras.

Cynoglossus sp.

The following specimens are either very young, or are badly preserved, so that the species cannot be determined.

164-5	Mutlah River.	..	..	"Golden Crown".
143, 173-6, 181-2—	Mormugao Bay, Portuguese India.			Kemp.
252	..	..	Off Puri, Orissa Coast, 4 to 4½ fms.	"
—.	..	..	Stn. 567 : Mergui Archipelago, 6 fms.	"Investigator".

3. **Symphurus** Rafinesque.

Symphurus, Rafinesque, *Indice Ittiol. Sicil.*, p. 52 (1810).

Aphoristia, Kaup, *Arch. Naturg.*, 1858, p. 106.

Ammopleurops, Günther, *Cat. Fish.*, IV, p. 490 (1862).

Several species from both coasts of America ; Mediterranean ; Indo-Pacific : four known from India.

Synopsis of the Indian Species.

- I. Depth $3\frac{3}{4}$ to 4 in length ; ocular side of body with numerous fine dark longitudinal lines, but without cross-bars ; blind side more or less coloured.
 - A. Angle of mouth below middle of eye ; pelvic separated from origin of anal by little more than an eye-length 1. *gilesii*.
 - B. Angle of mouth in front of middle of eye ; pelvic separated from origin of anal by at least two eye-lengths 2. *wood-masoni*.
- II. Depth 4 to $4\frac{1}{4}$ in length ; ocular side of body with dark cross-bars, but without longitudinal lines ; blind side colourless.
 - A. Head $3\frac{3}{4}$ to 4 in length ; 3 (or 4) cross-bars .. 3. *trifasciatus*.
 - B. Head $4\frac{1}{2}$ to 5 in length ; 7 (or 6) cross-bars .. 4. *septemstriatus*.

1. *Symphurus gilesii* (Alcock).

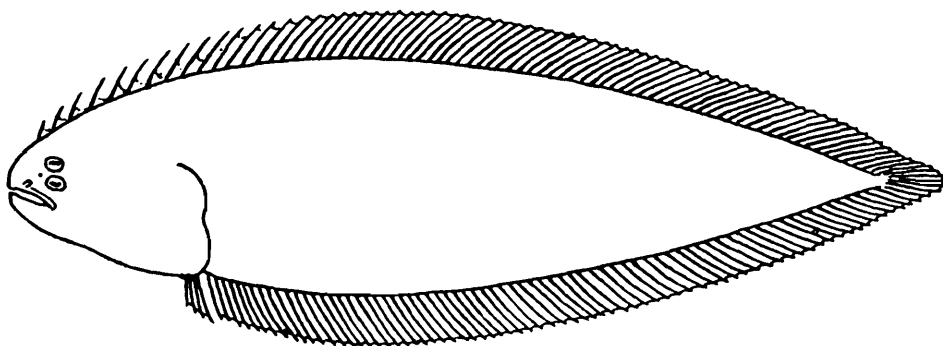
Aphoristia gilesii, Alcock, *J. Asiat. Soc. Bengal*, LVIII, pt. 2, p. 293, pl. xvii, fig. 2 (1889); *Ann. Mag. Nat. Hist.*, (6) IV, p. 398 (1889); *Illust. Zool. "Investigator,"* Fishes pl. xiv, fig. 4 (1895); *J. Asiat. Soc. Bengal*, LXV, pt. 2, p. 330 (1896); *Cat. Indian Deep-Sea Fish.*, p. 131 (1899).
 ? *Aphoristia gilesi*, Weber, "*Siboga*"-*Exped.*, Monogr. 57, p. 445 (1913).

Hab.—Bay of Bengal; Kei Isds.

11684

.. Bay of Bengal, 193 fms.

"Investigator".



TEXT-FIG 30.—Outline drawing of *Symphurus gilesii* (Alcock). $\frac{3}{4}$ Nat. size.

2. *Symphurus wood-masoni* (Alcock).

Aphoristia wood-masoni, Alcock, *J. Asiat. Soc. Bengal*, LVIII, pt. 2, p. 294, pl. xvii, fig. 1 (1889); *Ann. Mag. Nat. Hist.*, (6) X, p. 354 (1892); *Illust. Zool. "Investigator,"* Fishes pl. xvi, fig. 4 (1895); *J. Asiat. Soc. Bengal*, LXV, pt. 2, p. 330 (1896); *Cat. Ind. Deep-Sea Fish.*, p. 131 (1899); Regan, *Trans. Linn. Soc., Zool.*, XII, p. 235 (1908); Jenkins, *Mem. Ind. Mus.*, III, p. 30 (1910).

Aphoristia masoni, Alcock, *Ann. Mag. Nat. Hist.*, (6) IV, p. 398 (1889).

Hab.—Saya de Malha Bank; Laccadive Sea; Bay of Bengal; Andaman Sea.

F. 1015/1	..	Stn. 295; Persian Gulf, 37 to 40 fms.	"Investigator".
F. 986/1		Stn. 231: Laccadive Sea, 300 fms.	..
11767		Bay of Bengal, 490 fms.	..
12466	..	.. 265 fms.	..
13180	..	.. Stn. 132: Bay of Bengal, 475 fms.	..
F. 1138/1	..	.. 327: .. 419 fms.	..

Specimens in the British Museum from the Saya de Malha Bank, over 123 fms.

3. *Symphurus trifasciatus* (Alcock).

Aphoristia trifasciata, Alcock, *J. Asiat. Soc. Bengal*, LXIII, pt. 2, p. 132, pl. vii, fig. 4 (1894); *Illust. Zool. "Investigator,"* Fishes pl. xv, fig. 5 (1895); *J. Asiat. Soc. Bengal*, LXV, pt. 2, p. 330 (1896); *Cat. Indian Deep-Sea Fish.*, p. 133 (1899).

Hab.—Bay of Bengal—off Madras Coast; Gulf of Manaár.

251	..	Stn. 151: 13 $\frac{1}{2}$ miles N. 64° W. of Colombo Lt., 142 to 400 fms.	"Investigator".
13595-6, 13598-602. 13604-6, 13608-10.		Stn. 162: Bay of Bengal (off Madras Coast), 145 to 250 fms.	..

4. *Symphurus septemstriatus* (Alcock).

Aphoristia septemstriata, Alcock, *Ann. Mag. Nat. Hist.*, (6) VIII, p. 125 (1891);
Illust. Zool. "Investigator," Fishes pl. ii, fig. 1 (1892); *J. Asiat. Soc. Bengal*,
 LXV, pt. 2, p. 330 (1896); *Cat. Indian Deep-Sea Fish.*, p. 132 (1899).

Hab.—Gulf of Manaár; Andaman Sea.

13110	Stn. 151 : 13½ miles N. 64° W. of	"Investigator."
	Colombo Lt., 142 to 200 fms.	
13613-4	.. Stn. 115 : Andaman Sea, 118 to	..
	220 fms.	

ADDENDA TO PART I.*Pseudorhombus triocellatus.*

——. (2 spec.)	Sundarbans, mouth of R. Hughli.	Kemp.
—— ..	Puri, Orissa Coast.	

Pseudorhombus arsius.

——. (2 spec.)	Sundarbans, mouth of R. Hughli.	Kemp.
12115	Orissa Coast.	.. Marine Survey.

Pseudorhombus elevatus.

——. (2 spec.)	Gulf of Cambay, 25 to 30 fms.	"William Carriek".
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Engyprosopon grandisquama.

——	Sundarbans, mouth of R. Hughli.	Kemp.
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Bothus ovalis.

——	.. ???	
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Brachypleura novae-zeelandiae.

F. 6709/1	..	???	..	"Golden Crown".
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